EXHIBIT 7-C

By-Product Yields:

While the yield of coke from coal is exceptionally good (in the range of 80%), the yield of coal chemicals from the antiquated recovery system is somewhat less than would be expected from the average coke plant. Comparative yields of coal chemicals are as follows:

Coal Chemical Yields per Ton of Coal Coked

	Coke Company Plant	Average Industry
Tar	6.9 gallons	7.4 Gallons
Ammonia	3.9 Pounds	6.5 Pounds
Aromatics	2.3 Gallons	2.9 Gallons

Part of the lower by-product yield, particularly in the case of ammonia is the result of the higher percentage of low volatile coal used in the manufacture of foundry coke, while the remainder is the result of low efficiency of the recovery equipment.

The revenue from these by-products though substantial in dollar amount is a relatively small proportion of total revenue as indicated by the following revenue figures, and the Coke Company has not felt justified in the face of decreasing by-product prices in revamping, or in cases, repairing recovery equipment.

Year	Revenue from Coal Chemicals	Total Revenue	Per Cent of Revenue from Coal Chemicals
1952	$ 1,123,798	$ 11,849,903	9.5%
1953	1,144,982	13,189,828	8.7
1954	636,849	6,335,250	10.0
1955	862,265	11,855,494	7.3
1956	878,355	10,501,104	8.4
1957	834,335	10,271,107	8.1
1958	582,509	7,678,566	7.6
~~(3 months) 1959~~	~~138,800~~	~~2,387,777~~	~~5.8~~
1959	553,261	9,374,897	5.9
1960	561,622	8,137,569	6.9

The economics of by-product recovery were reviewed and based on actual costs it is indicated that recovery is only slightly profitable to marginal. On the basis of costs actually incurred and allocated against the recovery units the recovery operations would not appear economic, however, the abandonment of these operations would not result in the saving of the book costs that are presently charged to the operations.

In the case of light oil recovery the gas must be cleaned of naphthalene to prevent plugging in gas mains and accordingly certain minimum expenditures are required. In the case of ammonia the recovery unit could be shut down if it were desired, and the ammonia liquor diverted to the sewage plant as has been done in the past during periods of downtime on the ammonia recovery unit.

The trend in prices obtained for by-product coal chemicals is shown in Attached Table No. 9. Since 1952 the price of tar and ammonia has increased while the price of light oils has decreased markedly. As the market for these by-products changes and as major maintenance expenditures or capital additions to the by-product recovery system are required an analysis should be made to determine the economic desirability of continuing by-product recovery.

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January 1963

ANNUAL REPORT

MILWAUKEE SOLVAY COKE COMPANY, INC.

YEAR 1962

The Coke Company was purchased June 1, 1962, by Pickands Mather & Co., Snelling S. Robinson, President.

Operations for the seven month period resulted in the carbonization of 219,662 tons of coal. The plant operated the 200 ovens at a 48 hour coking cycle, on a three shift 7 day per week basis, 1,026 tons of coal per day. Foundry coke sales approached production. Crushed Coke and Breeze sales were considerably less than production. Coal chemicals moved as produced.

The Chicago and North Western Railroad strike during the month of September created a serious coke stocking problem. Our coke storage yard is separated from the producing plant by the C&NW railroad tracks, therefore, all movement of stock coke is handled by the C&NW Railroad. Since they were on strike no coke moved to storage. The coke production, to meet foundry sales, continued on a normal basis. The excess -3" coke, which was not sold but produced, was stocked in cars furnished by the other railroad serving us--The Milwaukee Road. Since stocking continued for a complete month, approximately 80 cars were held on track establishing a large demurrage bill. We are presently discussing the demurrage bill with the two railroads attempting to work out a settlement by mutual agreement.

A survey of the Koppers ovens was made by Madison-MacLean and Co., Coke Oven Consultants, during October and November. The report as a whole states that the Koppers ovens are in good operating condition but a continued patching program and end-flue repair work is necessary. The report expresses

concern over the gauging of the first and second lines on both walls in about 10 per cent of the ovens. We are presently investigating a new type pusher ram shoe which should relieve the movement of the coke between the ram and wall during the pushing operation thereby preventing further gauging. Also, we are evaluating the possibility of installing false floors in a few of the ovens when the gaugingis excessive. Our plan for the Koppers ovens is to continue our wall patching, floor flushing, and end-flue repairs. The end-flue program should continue on the basis of complete rebuilding concluded at the end of 1967--14 ovens per year at a cost of approximately $50,000 per year.

Solvay oven patching will continue when necessary. The Solvay re-lining program,after the four relining in 1963, will continue at an average rate of three relinings per year until 1971.

With the conclusion of the lake season, the coal unloading tower and belt line were inspected and the necessary maintenance was planned to prepare for the 1963 season. The labor department personnel was decreased.

On December 31, 1962, our labor force consisted of 338 hourly rated employees--22 non-exempt employees and 32 exempt employees.

BUDGET ITEMS IN EXCESS OF $5,000.

The following items are contemplated through the next five years:

1	"S" Coal belt conveyor	$ 12,000.
2	No.11 Coke belt conveyor	10,000.
3	60-65 Ton locomotive (used)	25,000.
4	Remote control of locomotive	16,000.
5	Dock dredging	10,000.
6	Boat tractor	10,000.
7	No.3 coal unloading tower bucket	10,000.
8	Repair coal pulverizer building foundation	20,000.
9	Replace coke quenching car	45,000.
10	Replace coke stocking and reclaiming truck	12,000.
11	Replace coal packing tractor	18,000.
12	Replace "Michigan" front-end loader	23,000.
13	Overhaul mill water pump turbine	12,000.
14	Painting three coal unloading towers	12,000.
	Total	$235,000.

These items are in addition to the Koppers and Solvay repairing relining programs. The Koppers budget - $50,000. per year; Solvay - $42,000. per year.

NEW INSTALLATION AND IMPROVEMENTS

A truck loading ramp was installed to handle truck coke by piggy-back. It is working satisfactorily. All truck hauling proceeded very well in spite of the extreme winter. Constructed a new roadway to the foundry loading booms to facilitate direct truck loading.

Started modernizing the electrical equipment for the Coal Handling department--mixing table and pulverizers. This will be completed in 1963. An automatic plastometer was purchased for the laboratory to expedite the work. Semi-automatic lubrication and remote control of the coal stacking and reclaiming bridge was installed--working satisfactorily.

Lunch room facilities for the Koppers ovens men were improved.

COAL TESTING

Ran a ten day test of Blue Boy-Algoma-Anthrafine mix to evaluate the yield of foundry coke. Yield was 64.7%, an increase of 6.7% over the present coals. The price of the test coals with the low by-product yields did not warrant the purchase of the coals. We should consider further testing because indications point to a lower coal price, which will make the mix profitable.

Also tested Splash Dam seam coals. These coals used in small percentages, up to 23% in the mix, would be economically feasible but the high ash would increase our foundry coke ash and drop the fixed carbon--question of customer reaction.

CHANGES IN ACCOUNTING METHOD

The old Coke Company had assigned values of $12.50 per ton for egg, range, and nut coke placed in inventory, $7.50 per ton for pea, $7.00 per ton for buckwheat, and $5.00 per ton for breeze. In September 1962, this practice was discontinued and by-product accounting was substituted retroactive to June 1, in which no value is assigned to -3" coke or chemical by-products placed in inventory, the proceeds of sales being credited to the cost of production of foundry coke. The effect during the seven months of operation in 1962 was to decrease profit before taxes by about $95,000., with a corresponding reduction in the balance sheet values of the inventory.

DEPRECIATION

At the time of the purchase of the Coke Plant, the method of depreciation selected for plant and equipment was the straight line method with a ten year life. Later in the year, however, the Internal Revenue Service promulgated new depreciation guidelines, which permitted the use on the majority of the items purchased June 1, 1962, of the 150% declining balance method of depreciation on a 12 year life, which makes the effective rate of depreciation 12½% for the first year compared with the 10% rate on a straight line method. The State of Wisconsin does not adopt the Federal method, however, and in computing the State income tax straight line depreciation must be used.

COAL

Coal Cost - Coal costs increased in 1962 as compared to 1961.

Type of Coal	F.O.B. Mine 1961	F.O.B. Mine 1962	Change
High Volatile	$4.85	$5.00	$0.15
Low Volatile	5.84	6.06	0.22
Anthrafine	4.80	4.85	0.05

Yield - Due to the recovery of coke from inventory, which must pass through the same screening plant as the production coke, no true yield can be shown. From short periods when production only was handled, indications are that a yield of between 58 and 59 per cent was achieved.

Direct Production Cost - Due to the change of accounting procedures, no comparison on direct cost with 1961 operation is feasible. For the seven month period, direct production cost was $3,709,982.25, on a per ton of foundry coke $29.59, on a per ton of coal coked (219,662 Tons of coal) $16.89. The 1963 annual report will show a comparison of seven months of 1962 and 1963.

SALES

Actual sales as compared to estimated sales:

Foundry coke actual was 121,706 Tons, up 706 Tons above estimate

Crushed coke " " 26,081 " down 3,324 " below "

Breeze coke " " 12,067 " down 5,633 " " "

By-products moved as produced with small changes in inventory.

Comments on seven months 1962 operation:

	Actual	Estimated	Increase (Decrease)
Foundry coke sales net	$3,603,692	$3,563,450	$ 40,242
Direct cost of production	3,709,982	3,658,000	51,982
Add (Deduct) Cost of Products sold from June 1 inventory	11,002	34,400	(23,397)
Coke & Chemical By-product sales	(771,185)	(884,270)	(113,085)
Foundry coke inventory (increase) decrease	(86,914)	(103,470)	(16,556)
Cost of sales	2,862,886	2,704,660	158,226
Gross margin	740,806	858,790	(117,984)
Fixed costs	682,860	706,990	(24,130)
Profit before taxes	57,946	151,800	(93,854)
Taxes on income	27,799	78,009	(50,210)
Net income	30,147	73,791	(43,644)

LABOR RELATIONS

Labor relations have been satisfactory; we have had four grievances, two concerning combining of jobs, namely, the combining of the ovens repairman and quenching car repairman machinist and the combining of the plant oiler and ovens oiler, in each case the action was precipitated by the retiring of a man in each of the two categories.

A feed-back indicates that the employees expect more from P.M.& Co. than has been forthcoming. We are considering the idea of a monthly bulletin to better inform our employees of all phases of operation and future planning.

SAFETY

Our safety record requires considerable improvement. We have been conducting bi-weekly and at present monthly foremen's safety meetings. The foremen in turn are conducting safety meetings with their men. The feed-back from our employees show definite signs of safety-mindedness. We have also instituted a compulsory safety eye-glass program. Our lost frequency rate for the first five months was 20.7, the seven months under P.M.& Co. was 17.7. The last four months with our safety program stepping into high gear was 11.6. We are confident that our employees will increase their safety-mindedness with a result in a decrease of lost time accidents.

OPERATING DATA

		Production	Sale	Inventory Increase (Decrease)
Foundry coke	(Tons)	125,400	121,706	3,694
Crushed coke	"	33,496	26,081	7,415
Breeze	"	14,409	12,067	2,342
Ammonia	(Lbs.)	465,143	672,188	(207,045)
Light Oil Products	(Gals.)	431,616	446,545	(14,929)
Tar	"	1,183,681	1,088,828	(94,853)

Net production cost (per ton foundry coke)	$ 23.52
Total cost	$ 29.13
Net sales	$ 29.61

Gas, as produced, is fired in our boilers; excess gas is flared.

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1966 By Products Report

VERN E. ALDEN COMPANY
ENGINEERS
173 WEST MADISON STREET
FRANKLIN 2-0255 CHICAGO, ILL. 60602

J.O. 929

October 6, 1966

MILWAUKEE SOLVAY COKE PLANT

Thoughts in Regard to Study on By-Products

* * * * * *

1. The principal income from this plant is the sale of foundry coke. Foundry coke must be a strong coke. A 50-50 mixture of high volatile and low volatile coal is used. The final average coke temperature is about 1640°. A coking cycle of 32 hours is used. All of these things tend to produce a strong coke.

2. Operating as indicated above will produce less gas, less tar, and less ammonia than might be generated in a steel mill coke plant. Operating in this manner will generate about the maximum of light oils.

3. A coke plant operated as indicated above will produce about 10,000 cu ft of gas per ton of coal and this means that about 5,000,000,000 cu ft of gas would be produced per year. The plant will use about 55% of this gas for heating the ovens, ~~and for steam generation.~~ This ~~means~~ that about 2,250,000,000 of gas per year might be available for other usage. This gas is at present being flared. If this amount of gas could be sold as fuel for only 1¢ per therm, it would represent an income of ~~$112,500~~. Due to the variation in the amounts of gas produced and in its heat content, the sale of this gas may be difficult. It would be most advantageous if an industrial customer in the nearby area could be found. This gas contains something approaching 50% hydrogen. If some nearby chemical plant could be found which is engaged in hydrogenation processes, it might be possible to separate out the hydrogen for sale.

4. It would seem that a plant operating at this temperature might be expected to produce something in the order of ~~10~~ 11 gallons of tar per ton. This would indicate an income per year from the sale of tar of some $425,000.

5. We understand the ammonia production is about 3.6 pounds of NH_3 per ton of coal. We would think that as much as 4.4 pounds per ton of coal might be expected if attempts were made to extract all of the ammonia. This would indicate an income of some $66,000 per year from the sale of ammonia if we assume an average price of 3¢ per pound. In order to do this, it might be necessary to install an ammonia storage tank. Another alternate would be to make arrangements with the purchaser to store this ammonia in their own storage tanks. There are a good many large sized storage tanks now installed. It might be desirable to make ammonium sulphate rather than aqueous ammonia. (This would make the storage problem much less complicated.)

6. The light oil is not now being extracted. It would seem that one might expect about 2-1/2 2.35 gallons per ton of coal in a plant operated as indicated above. This would result in 1,250,000 gallons of oil per year. We would think that it would be indicated that this oil be sold as "bulk crude" rather than as "refined" as was originally done. If this oil was sold at 5¢ per gallon, it would provide an income of $62,500 per year.

7. The above paragraphs indicate that the total income per year which might be expected from the by-products is perhaps something in the order of $500,000, not taking into account the possibilities of obtaining some revenue from the excess gas. This would seem to indicate that considerable careful thought should be given to the recovery of these by-products rather than to contemplate their discontinuance.

8. From a rather quick review of the records, it would seem to us that there is considerably more labor used at the plant than one would expect.

9. Perhaps a new by-product line could be economically justified. A new product line, better arranged, with good instrumentation and with good automation, would require less labor, and this might prove to be very interesting. We will develop such costs.

10. One possibility might be to consider the elimination of the by-products. If this were to be considered, the following conditions would seem to be indicated.

a. The excess gas would continue to be flared as it is now.

b. It would be necessary to remove the tar from the gas which is used in the plant in order not to"gum up" the burners.

c. If the ammonia was not collected, it would be necessary to dispose of the flushing liquor into the sewer line. This liquor is a very weak ammonia solution and might not be too objectionable to the sewage disposal plant. This would have to be investigated rather carefully. There would be a considerable amount of this effluent, probably something in the order of 1000 gallons a minute.

Signed _____
F. D. Troxel
Senior Partner and
Engineering Manager

FDT/np

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1966 Operating Items

September 19, 1966
Job No. 1707

MEMORANDUM NO. 1

MEMORANDUM OF MEETING AT MILWAUKEE OFFICE OF MILWAUKEE SOLVAY COKE COMPANY - September 7, 1966

Present:
Pickands Mather - J. H. Bemis, R. A. Davis, J. R. Lenz, A. P. Mueller, W.J. Plichta

Allen & Garcia - O. E. Brumbaugh, Paul Levin, A. L. Reed

ORGANIZATIONAL ITEMS

Invoicing - Directed to Davis. Davis will advise number of copies required. Invoicing will be paid by Milwaukee. Invoices are to be prepared in two separate forms - one invoice for payroll and markup - one invoice for expenses.

Auditing - From Milwaukee.

Weekly Report - To be prepared in letter-narrative form. Directed to Davis - two copies, Mueller - one copy.

Cost Summary - Submitted every other week and submitted as part of the weekly report.

Owner's Representative - To be named in contract. Probably Davis.

Plant Contact - Mueller.

Plant Visits - To be cleared with Lenz.

OPERATING ITEMS

Coal

Annual coal tonnage - 500,000 tons approximately. A 50 - 50 blend of high volatile coal (29 - 33%) and low volatile coal (17 - 19%) is used. There are three sources of H.V. and three of L.V. - all from West Virginia.

Coal specifications - Moisture - 4 - 4.5%, Ash - 5% (Dry Basis), Sulphur - .7% (D.B.), maximum size - 2".

Coal is shipped from the latter part of April to the latter part of November, regularly in this interval except for the miners' vacation. Shipped by rail to Toledo and Sandusky and thence by lake boat to Milwaukee.

Rail freight to the lake port H.V. - $3.59 per ton, L.V. - $3.76 per ton. Water freight to Milwaukee - $.93 per ton. Handling charge at the boat loading port - $.18 per ton. This gives total rates of H.V. - $4.70, L.V. - $4.87. (Note - this does not check figures given as the total freight rate of H.V. - $4.53 per ton, L.V. - $4.70 per ton.)

Unit train rate - estimate based on rates to Chicago and to Waukegan - between $5.70 and $5.80 per ton.

Self-unloading vessels - freight rate - $1.75 per ton above present rate of $.93 per ton for water haul, giving total rates of H.V. - $6.45, L.V. - $6.62.

Self-unloading vessels vessels, unloading rate capacity - 1,500 - 2,000 tons per hour.

Boom length - 300' maximum.

Single car rate - approximately same as self-unloading vessels rate, giving freight rates of H.V. - $6.45, L.V. - $6.62.

The present vessels being used for hauling coal to Milwaukee are 3-compartment boats with 21' to 22' draft limit - now 14" to 15' draft. Capacity 12,000 to 13,000 tons - maximum 15,500 tons. Beam limit - 60'. This corresponds to vessel about 650' long. Beam limitation due to the bridge in the Kinnikinnic Basin. Boats unload in 26 to 27 hours. No demurrage is involved. The increase in boat sizes will probably cause an increase in the water freight rate on the small boats able to pass the bridge in the Kinnikinnic Basin.

Coal firing and weathering is no problem at present but all coal unloaded after mid-August is compacted with a Caterpillar Tractor.

Minimum coal storage pile - 30 day supply, say - 50,000 tons.

Coal is handled on a first-in, first-out basis.

The coal unloading rigs were installed in 1906 - 1908. The maximum unloading rate for the three rigs is 600 tons per hour. The bucket size 2-1/2 c.y. Unloading operating costs average about $.28 per ton of coal.

The reclaiming bucket has a capacity of 8 tons and an average unloading rate of 250 tons per hour.

The coal conveying system capacity is 600 tons per hour.

The coal is presently crushed in hammer mills to 88 - 90% through a 1/8" screen.

Oil is added to the coal blend, presently #6 oil, at a rate of 1/2 gallons per ton.

Will switch to #2 oil for more consistent bulk density.

The weighted moisture of the coal as charged in the ovens in 1965 was H.V. - 4.35%, L.V. - 4.65% - average - 4.5%.

Coke

Goal - Produce about 300,000 tons of coke annually at 90 to 95% of plant capacity.

Present production of foundry coke - 325,000 tons annually.

Foundry coke constitutes 75% of total coke sales.

Foundry coke is produced in the following sizes: 9" x 7", 7" x 5", 5" x 4", 4" x 3". (Square mesh.)

Other coke sizes: 3" x 2-1/2" - egg, 2-1/2" x 1-5/8" - range, 1-5/8" x 1" - chestnut or #1 nut, 1" x 5/8" - pea or #2 nut, 5/8" x 0 - breeze.

Foundry coke specifications: Ash - maximum 6.5 - 7.0%
Sulphur - .60%

400 to 500 customers for foundry coke, mostly in the automotive business.

Sales of coke drop off during July and August due to vacations and also in December. Some coke must be stored on the ground during these periods.

Sales per customer varies from one car per year to two to three cars per day.

Shipments are about 40% by truck (98% contract hauling) and 60% by rail.

The trucks hold about 20 tons per load and are loaded in one hour to one hour and fifteen minutes.

The usual customer inventory is about forty-eight hours.

Foundry coke published price F.O.B. ovens is $34.50 per net ton for all sizes. The net price averages $33.00 per net ton since some freight is absorbed on shipments over 150 miles in order to be competitive.

There is a market of 18,000 to 20,000 per year of 3" coke in the beet sugar industry. Price is $18.00 per ton.

There is a small chemical coke market but no market for domestic coke.

No foundry coke is produced west of St. Paul.

All of the coke breeze produced is used to make inert for coke blending.

There is no objection to combining screening plants for foundry and domestic coke.

Coke breeze has 12% moisture. Is drying practical to reduce the moisture to 6%? Rate is 120 tons per day.

Ovens

Coking cycle is 32 hours plus.

There are 100 Koppers ovens built in 1921 - 1922, and 100 Solvay ovens built in 1903 - 1904 (except for 20 ovens built in 1959).

The ovens have a 10-ton capacity each approximately.

Due to continuous maintenance, most of the ovens are 25 years old or younger.

Expected life of ovens is approximately 35 years.

If the Koppers ovens fail - operate at lower capacity?

We are to make no direct contact with Koppers or Solvay yet on the matter of coke ovens.

Tar

Tar is shipped as produced; little inventory is maintained.

Production of tar is 5 gallons per ton of coal charged - 7,500 gallons per day.

Tar is sold to Koppers at $.08-1/2 per gallon on contract under which Koppers guarantees to take all tar produced.

Ammonia

The demand for ammonia products is seasonal. Maximum sales are in April, May and June. Minimum sales are December and January, during which some ammonia is dumped into the sanitary sewer.

Ammonia is sold as a liquid with 29 to 31% NH_3.

Production of ammonia is 3.6 pounds of NH_3 per ton of coal charged. It is sold in gallon lots priced at $.03-1/2 per pound of NH_3 contained in the liquid. Dump price is $.02 to .02-1/2 per pound.

The price of ammonia is depressed at present.

Gas

Ovens use 55% of the gas produced - the remainder going to boilers and to flare.

Gas - 500 BTU.

Power

The plant generates 80 to 90% of the power used. Generation is at 250 volts D.C.

Generator ages -- one turbo generator - 1908
one turbo generator - 1920
one M.G. set - 1929

Have some A.C. motors. Maximum D.C. motor - 275 H.P.

Plant tied to Wisconsin Electric Power Company.

Gas compressors are all steam driven.

Boilers operate on 100% makeup.

MISCELLANEOUS

Returned to river - quench water, condensate, cooling coil water.

Ammonia waste goes to sanitary sewer.

Prevailing wind is southwest.

Safety must be paramount in the plant design.

Amortization on major equipment - 12 years. On ancillary items - 3 years.

Use 6% as money value.

Light oil is not recovered now. Economics of recovering and selling?

C and O property south of the plant - 17 plus acres compared to 13 acres in east yard now used for coke storage - now available as direct trade for east yard. Can it be used profitably? Service by Milwaukee Road but can be served by Northwestern Railroad.

Pollution control regulations - obtain from Milwaukee Public officials, but without identifying P M or Milwaukee Solvay Coke Company.

Paul Levin

Paul Levin
Vice President

PL:rl

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1967 Air Pollution

rate scale would attract a better type personnel.

C. STUDY INCREASING CAPACITY THROUGH PRE-DRYING OF COAL TO INCREASE BULK DENSITY

The coal now being charged to the ovens averages approximately 4.5% total moisture content. This coal would have a higher bulk density with a lower moisture content but if an attempt were made to dry the coal below 2% surface moisture, the dust nuisance would be very severe. If we assume an inherent moisture of 1% then we would be limited to a total moisture of 3%. From test data available on other coals, we might expect an increase in bulk density of approximately 6% by reducing the total moisture of the coal from 4-1/2% to 3%. There would be an additional benefit of approximately 1% representing a reduction in BTU input into the ovens because of less moisture to be evaporated. Considering the effort required to dry the coal from 4-1/2% to 3% - installing and operating a dryer and combating a dust problem which in the City of Milwaukee would require a very expensive dust collecting system - we do not recommend that any effort be made to carry this matter any further.

AIR AND WATER POLLUTION PROBLEM

A. AIR POLLUTION

1. Control of Coal Charging

We understand that Koppers is offering a charging larry car with built-in dust collection and scrubbing. Because of our instructions we have not attempted to contact Koppers to investigate this any further.

Another approach which we understand is being considered presently by Milwaukee Solvay Coke is to install vibrators on the present larry cars to expedite dumping of the car hoppers into the ovens. This, of course, would be helpful in reducing the smoke nuisance.

2. The Economics of Atmosphere Quenching Versus Water Quenching

We have investigated this technique and find that it is not being used in this country but has been used in Europe where the BTU regained by atmospheric quenching was of paramount importance. We understand that atmospheric quenching, called "Sulzer dry quench" was tried in this country in the early twenties but was dropped and not tried again. In our case where the heat regained would have only a low value, it does not appear to be a feasible system.

3. General Comments

The Milwaukee County code covering air pollution limits smoke emission concentration to less than No. 2 Ringelmann, permitting smoke equal to or exceeding No. 2 Ringelmann only during limited periods or for stated exemptions. Dust emission is limited to .85 lbs. per 1000 lbs. of gases (in stacks). There is in addition a clause which prohibits air pollution which causes a "detriment, nuisance or annoyance".

From our observations, those cases which might possibly violate these restrictions are:

a. Dust from dropping coal on the storage pile from the coal bridge blowing from the pile. The dust from dropping coal

might be reduced by using a telescoping spout when the wind is high enough to blow the coal. Oiling the pile would tend to reduce the nuisance from this source, but because of the problems of applying the oil and the difficulty in keeping the oiled surfaces intact, this should be considered a last resort.

b. Smoke from the top of the coke ovens toward the end of the charging period. A new or modified larry car as discussed earlier in this report would help reduce this nuisance. Fortunately this is of short duration.

c. Dust from coke dropping into the quench car from the oven during the pushing. To remedy this would be difficult. This, however, is also of short duration.

d. Dust arising from the stocking and reloading of coke in the storage yard. This seemed to be bad one day when we observed M3 coke being loaded from the storage pile. The worst dust occurred when the front end loader dumped the coke into the hopper at the elevating conveyor. The coke may have been especially dry from exposure in the yard. One solution might be to wet the coke before loading, but this might create problems with the purchaser. Another would be to enclose the dumping hopper and if necessary install dust collection.

The dusting in the coke screening plant did not seem excessive, but conceivably, in the future, some type of dust collection might have to be installed if the regulations become very restrictive.

In this connection, it is interesting to note that the "Draft of Emission Standards for New and Existing Equipment" for consideration by the Illinois Air Pollution Control Board, dated September 29, 1966 provides for strict regulations regarding smoke and dust emission, but specifically permits by-product coke plants to exceed the limits up to 20 minutes in any 60 minute period when charging or pushing ovens. The other provision covering coke plants requires that oven doors, frames and ovens be so maintained that excessive smoke is not emitted.

B. WATER POLLUTION

1. Present Water Pollution

At present, the plant has two types of liquid discharge - one to the river and the other to the City of Milwaukee sanitary sewer. The discharge to the river consists of surface drainage, overflow from the quench water settling ponds, turbine condenser water and cooling coil cooling water. If the quench water ponds are kept clean, none of these discharges should constitute a source of pollution. A sample of plant effluent analyzed by Nalco Chemical Co. in November, 1965 indicated a

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1968 Operations Report

Milwaukee Solvay Coke Co.
A Division of Pickands Mather & Co.

This division has a 138,000 square foot plant, approximately 60 years old, in Milwaukee, Wisconsin, located upon a 42 acre parcel of water front real estate. The plant is a producer of foundry coke and related cokes and chemical by-products. It operates approximately 200 coke ovens and employs approximately 375 employees (45 salary and 330 hourly). The plant operates continuously 24 hours per day, 365 days of the year.

All of the coke is sold on the open market primarily to foundry operators, and by-products to others. The ten largest foundry customers in 1967 were:

Company	Sales dollars in rounded thousands
Textron, Inc.	700
General Motors Corp.	450
International Harvester Co.	440
Kohler Co.	380
Deere & Co.	360
Neenah Foundry Co.	290
Allis Chalmers Mfg. Co.	260
Grede Foundries, Inc.	250
National Castings Div., Midland-Ross Corp.	240
Motor Castings Co.	220

The raw material used in the manufacture of coke is coal (current yield per tons is about 60% foundry versus the industry of approximately 67%). In 1967, cost of coal charged to income was $5,600 in rounded thousands, Pickands Mather & Co. being the sole supplier. The business of marketing foundry coke is highly competitive. The six major competitors being

Company	Location
Alabama By-Products Corp.	Birmingham, Ala.
Citizens Gas & Coke Utility	Indianapolis, Ind.
Indiana Gas & Chemical Corp.	Terre Haute, Ind.
Semet-Solvay Div., Allied Chemical Co.	Detroit, Mich.
Great Lakes Carbon Corp.	St. Louis, Mo.
Koppers Co.	Kearney, N.J.

United States foundry coke production in rounded thousands of tons was approximately 2,500 in 1967 and 2,700 in 1966, according to the U. S. Department of the Interior, Bureau of Mines, and approximately 12% thereof being produced by this plant.

A brief description of the operations of the plant follows.

Coal Unloading and Storage

The coal which is used at the Coke Plant is received in steamers which bring about 12,500 tons each trip. It takes about 26 hours to unload a cargo. There are three unloading towers with clam shell buckets each holding about 2½ tons of coal. The buckets empty the coal into a hopper from which it is led onto a conveyor belt and after passing to other belts, is carried onto the bridge which spans the coal storage field. This bridge may be moved over any part of the field which has a capacity of 400,000 tons of coal. It is arranged to deliver coal to any part of the field by means of a tripper on the conveyor belt. It also has an 8-ton clam shell bucket for reclaiming coal from the field. One kind of coal may be reclaimed from the field at the same time another kind is being unloaded into the field by steamers.

Two caterpillar tractors are used - one to facilitate scraping up the coal in the bottom of the boat when a steamer is being unloaded and another to level and pack the coal in the field. This is to prevent heating and spontaneous combustion as well as to increase the tonnage which may be stored.

Coal boats do not run during the winter, therefore, enough coal is stored to last until spring.

Coal Crushing and Mixing

In order to produce the desired quality of coke two general classes of coal are used - high volatile and low volatile coal. These are blended approximately 45% to 46% of each, plus 8% to 10% of coke breeze to make large, hard, dense foundry coke, whereas to produce coke for domestic purposes 85% of high and 15% of low volatile coals are used. omit

The coal purchased consists of 2" Nut & Slack, and Slack. The coal is charged to bins from which it is run through hammer mills, steel hammers on a shaft which revolve at high speed and force the coal through a screen. This reduces the size of the coal particles until, under test, 85% to 90% will pass through a 1/8" mesh screen.

The desired percentage of each kind of coal is obtained by means of revolving tables equipped with knives which may be set to remove the determined amount. After pulverizing, the coal passes over conveyors to the oven bins from which it is drawn for charging into the ovens.

Ovens

The ovens are red hot chambers 33' long, 10' high and 17" wide, having a capacity of 10 tons of coal for each charge. The coal is drawn from the bins into larry cars which move along the top of the ovens to the oven which is to be charged. The coal is run into the oven through charging holes in the top of the oven after which the covers are put on and the coal allowed to coke for the necessary length of time. The coking time for the production of foundry coke in normal times is 32 hours and for domestic coke 17 hours. omit

When the coking process is finished, the doors at each end of the ovens are removed and the red hot coke is pushed out into a quenching car and quenched with water. After pushing out the coke, the doors are replaced and luted (sealed) with mud (mixture of clay and cinders) to exclude air.

Ovens (continued)

The ovens are heated by means of gas which is burned in flues located in the brickwork on each side of the oven chambers.

There are 100 Koppers and 100 Solvay ovens, making a total of 200 ovens.

Gas

As the coal is heated in the ovens, gas, containing tar, ammonia and light oil and water vapors, is driven off. The vapors pass up a standpipe and enter a collecting main. From the main the hot gases are drawn by means of exhausters (gas pumps) through coolers and forced through more coolers and scrubbers, finally being pumped either to the ovens for heating or to the boiler house to generate steam. Excess gas is flared.

Tar

The tar exists in the gases as a fog and when the gases are cooled it may be separated by impingement. This is done mostly in the coolers or scrubbers. These are vertical tanks containing wooden hurdles with narrow spacing. The gases are forced up through the hurdles against a spray of water. Particles of tar adhere to each other in this process forming drops which separate out and fall to the bottom of the cooler. From here the tar is lead through decanters to separate the water and then to the storage tank. It is shipped in railroad tank cars. OR BY TRUCK

Coke Handling

The red hot coke after being pushed out of the ovens is quenched with water and unloaded onto a wharf. From the wharf it passes over belt conveyors to crushers, screens and finally to loading equipment. Foundry coke, which needs to be of large size, is not crushed but passes over a screen to remove small pieces, after which it passes over a picking table where unsuitable pieces are discarded. It is then loaded into railroad cars or trucks.

Domestic coke is passed through crushers and then over screens to separate the desired sizes. These are egg, range, chestnut and pea coke. Coke breeze (or fines) is also separated and is used as part of the coal blend. Domestic coke is loaded into railroad cars and trucks.

Since coke shipments are not uniform through the year, it is necessary to put coke into a storage field during some seasons and reclaim it during others. The storage yard has a capacity of about 90,000 tons of coke.

Locomotives and Cranes

~~Three~~ Two Diesel locomotives are used in switching, weighing, spotting and handling railroad equipment. Locomotive cranes are used for handling coke to and from stock and for handling other materials.

Power House and Electrical Department

Most of the equipment is powered with D.C. motors and the power house has capacity to supply the necessary current. A standby substation and motor generator set utilizing purchased current is used in emergencies and to supply additional capacity during extra heavy demands. Air compressors supply compressed air for many operating uses and for repair work.

Boiler House and Water Department

A great deal of steam is needed. This is produced mostly in the boiler house using gas from the coke ovens. Boiler feed water is treated with soda ash, lime and sodium aluminate. The water for cooling and for most other processes is pumped from the river, but city water is used for many purposes such as ammonia absorption, in wash rooms and laboratory work.

Mechanical Department

A great deal of repair work has to be done necessitating work by machinists, electricians, blacksmiths, ironworkers, carpenters, painters and general repair men.

Laboratory

A laboratory is maintained for testing coal, coke, by-products, various materials and to make control tests to guide operations.

Yield of Coke and By-Products

One ton of coal yields nearly 3/4 tons of coke and about 130 pounds of coke breeze.

The yields of by-products vary considerably depending on the grade of coal used and the operating conditions. An example of normal yields per ton of coal is as follows:

Gas	58 - 60 therms *
Tar	5.0 gallons

*(1 therm = 100,000 Btu)

9/17/68

C19

1969 Capacity / Production

June 30, 1969

The Milwaukee Solvay Coke Division was purchased in 1962. Pickands Mather & Co. had been sales agents for the former owners (the local Gas Utility) since the ovens were built in 1904.

The plant consists of 200 ovens, 100 Koppers and 100 Solvays, and has a capacity of 300,000 tons of Foundry Coke per year. (The plant employs about 360 people and operates 24 hours per day, seven days per week. We have a three year labor contract with six operating unions which runs to March 1, 1971.)

The coal arrives at the plant by boat during the navigation season. By late November enough coal is in storage to run until early May. This year, due to strikes in the coal industry, rail coal will be used to augment the boat tonnage.

A plant this size will carbonize over 1/2 million tons of coal per year and will produce 300,000 tons of foundry coke (plus 3") and 60,000 tons of coke minus 3".

We have about 10% of the merchant coke capacity and about the same share of the foundry coke market.

We sell about 1/3, or 100,000 tons, of foundry coke to 10 large customers and the balance to 250 smaller users.

80% of the foundry tonnage is sold in the States of Wisconsin, Illinois and Michigan.

C20

Coke Plant Operations
(year unknown)

COKE PLANT

Coal Preparation System

Two railroad tracks are located between transite covered wind breaks and have coke oven gas burner pipes between the rails for car thawing. There is space for about six cars on each of these tracks. Cars are advanced by an electric mule for bottom dumping into two track hoppers, feeding onto a belt conveying system. A trolley mounted Link-Belt shake-out is used to expedite car unloading.

Coal is transported to the breaker building where it passes through a Bradford breaker and a Pennsylvania Crusher Company hammer mill, powered by a 400 H.P., 2300 volt motor. Bulk density is controlled by an oil spray after the hammer mill. The crushed coal is conveyed to the mixer building, where it is stored in one of four 250 ton storage bins. From these, it is withdrawn by a volumetric proportioning system, through a paddle mixer and thence conveyed to the 1800 ton larry bin.

Coke Ovens

Two batteries of 47 ovens each of Koppers ovens were built in 1916 and abandoned in 1971. These are still standing. Located between the two batteries is an overhead 1800 ton coal storage bin, which is still used to charge the larry cars.

Located to the north of the above is "C" battery, containing 57 ovens of the Wilputte underjet design, constructed in 1953.

Height of oven - 11'-2" hot
Length - 37-9-1/4" face of doors hot
Cubic content - 566 cu. ft.
Oven capacity - 13.6 tons of coal
Designed for 16.5 hour coking time

Brick lined concrete waste gas stack is 7'-8" diameter by 200' high.

The battery control room is located between "C" battery and the old "B" battery. It contains the normal complement of battery instrumentation and controls, the reversing machine, fuel gas heater, decarbonizing air blower, electrical gear, etc. In this area also is the oven foreman's office, and locker and shower room, and an hourly personnel lunch room.

This entire area, and also the battery basement, is equipped with a number of gas detection units which sound an alarm when any unit detects gas concentration in excess of 10% of L.E.L. At 40% L.E.L., an automatic system sounds a different alarm, shuts off the fuel gas, initiates a purge and puts the battery in neutral. A TV camaera, with monitor, permits monitoring of this system from a remote location.

There is one collector main on the coke side. The ovens have four charging holes and 30 flues. Goosenecks are equipped with aspirating steam nozzles and the standpipes with decarbonizing steam jets.

There are two larry cars, built in 1916 and completely rebuilt in 1976-1977. These four hopper cars have been equipped with smoke seal sleeves, pneumatically operated from remote controls, for stage charging. Lid lifting and replacement is manual.

Two pusher machines were built in 1916 and have been equipped with hydraulic door extractors. One door machine was built in 1953, with hydraulic door extractor. There is one coke guide and one spare. The coke guide is equipped with an Interlake designed spray system to suppress emissions from the coke. Water is carried on a trailer tank car, running on the door machine rails.

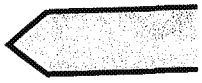
Coke Handling System

There are two 10 ton quench cars and two quench car locomotives. The quench cars are equipped with water storage tanks, pumps and spray systems to suppress emissions while traveling from the battery to the quench tower. The quench tower is a brick structure 50 ft. by 20 ft. by 50 ft. high, equipped with a 20,000 gal. elevated water tank and a quench spray system. The top of the tower is equipped with slat type grit eliminators. The excess water passes through a settling basin for recirculation. Makeup water is supplied from the discharge of the shell and tube primary coolers.

Coke is discharged onto a 121'-6" long wharf, containing 40 pneumatically operated, manually controlled gates. It is then conveyed to the coke screening station, where it passes over a scalping screen. The oversize goes to a 24" x 48" jaw crusher, the discharge of which joins the scalping screen undersize and passes to the sizing screens, where it is separated into three fractions. The furnace size is conveyed to the conveyor which carries it to the blast furnace coke bins. It can also be diverted to a boom conveyor and loaded into railroad cars. The smaller sizes are discharged into railroad cars under the screening station. Considerable flexibility is available in determining top size, cut sizes, mixes of sizes, etc.

By-Product Plant

There are four shell and tube primary coolers, each with 1023 three inch tubes, installed in 1916. The coke oven gas exhauster is an Allis-Chalmers unit, rated at 28,200 cfm with a suction pressure of 13.35 psia and discharge pressure of 4.00 psig, at 4250 RPM. It is driven by a 785 HP Worthington turbine, utilizing 140 psig steam, and exhausting through a barometric condenser. These were installed in 1953. The backup equipment consists of two Connersville piston type blowers, rated at 12,850 cfm each, driven by Buckeye reciprocating steam engines, operating on 140 psig steam. These were installed in 1916.



Two Research-Cottrell precipitators, installed in 1958, are used for tar removal. They are rated at 17,500 cfm each, measured at inlet conditions, with 95% tar removal efficiency. Each contains 88 eight inch by 9'-0" electrode tubes. A gas reheater unit is mounted on top of each precipitator.

These are followed by a stainless steel ammonia absorber unit and an ammonium sulfate system that has been modified to produce a concentrated liquid product for sale as a fertilizer.

Four grid type, water spray, counterflow final coolers are next in the gas flow line. The effluent water passes through retention basins for naphthalene separation and is recirculated through a cooling tower.

The gas booster is a Roots-Connerville lobe type, positive displacement unit, rated at 14,100 cfm at 308 RPM, against 12.5 psig pressure. It is driven by a 1029 HP Worthington turbine, at 3700 RPM, through a double reduction gear reducer.

Gas is delivered to two 20,000 cubic foot capacity piston type gas holders for supplying the underfiring fuel system. Surplus gas is delivered to the Toledo Edison Company through an Interlake owned, underground, 20" main, approximately two miles long.

There are all of the required hot drain pumps, tar loading pumps, flushing liquor pumps, wash oil circulating pumps tar loading pumps, etc. There are two drag bucket type decanters, three 10,000 gallon sulfuric acid storage tanks, two 230,000 gallon tar storage tanks and miscellaneous other tar transfer tanks, flushing liquor tanks, etc. In the fuel gas calorimeter room is a Cutler-Hammer calorimeter.

There are 300 KVA and 1,000 KVA 2300/440 V substations distributing AC power at the coke plant. There is a DC control room, with switchboard for distributing DC power. A small laboratory is equipped for routine testing.

Benzol Plant

The benzol plant was built in 1916. The main building contains a continuous light oil still, crude benzol still, three pure benzol stills, pure still residue removal column, crude BTX washing agitator and various pumps, tanks, etc., associated with this equipment.

Outside the building are the light oil condenser, light oil decanter, acid pots, sulfuric acid and caustic soda storage tanks, wash oil coolers and various other pumps, tanks and associated equipment.

The benzol storage building contains 18 storage tanks of varying capacity for crude and pure product. There are a number of outside storage tanks, with capacities of up to one million gallons. There is a tank truck loading station as well as a railroad tank car loading station.

Miscellaneous

There is a 30,000 gallon liquid propane storage tank, a vaporizer, an air mixing system and necessary controls for emergency underfiring of the coke oven battery.

There are miscellaneous small buildings for storage, sanitary facilities, etc. At the coke plant entrance is a gatehouse, which also contains the coke plant superintendent's office. Adjacent is the locker and shower room facilities for the coke plant.

A one-story brick maintenance building contains a small shop, coke plant stores area, operating offices, DC switchboard room and electrical shop.

EQUIPMENT LIST

The following is a list of specific equipment associated with the above described coke plant facilities:

COAL HANDLING

Car Thawing Shed

Coke oven gas is used to thaw frozen coal cars, six cars on Track No. 1 and four cars on Track No. 2 - thawing capacity 30 cars per shift.

Electric Coal Pusher Locomotive (1 unit) - G.E. manufacturer, 250 V.D.C.

Coal Handling Building

Car Shakeouts, Hewitt-Robbins (1972), Link Belt (1966).

Hoist (car shakeout), 5 ton capacity, 20-25 ft. height of lift, 6 HP motor and starter, 1.6 HP trolley motor and starter.

Duplex Shaker Feeders, (2 units), Robbins Conveying Belt Co. with 10 HP 230 V.D.C. motor.

Pan Conveyor, Steel Plate Belt, 42" wide x 43'-0" long with 10 HP D.C. motor and speed reducer.

System of conveyor belts from Coal Handling Building to 1800 ton Larry Car supply bins.

Breaker Building

Magnetic Pulley - 30" dia., 38" crown face, permanent magnet, - Stearns Magnetic Products.

Hammermill, 400 HP, 2300 V. Pennsylvania Crusher Co.

Bedford Breaker, 100 HP, 230 V.D.C., Heyle & Patterson Oil Meter - to control bulk density.

Rectangular magnet, 42" wide x 431" x 21½" high for coal handling, 230 V.D.C., Schrader Magnetic Equipment.

Coal Mixer Building

Proportional Mixer, 25 HP motor, 230 V., 21 cast iron paddles per shaft, bin size = 4'-0" wide x 4'-3" long x 4'-8" high.

Mixer bins, (4 units) 20 ft. sq., 250 ton capacity.

Vibrators, 230 V., Syntron Co.

1800 ton Larry Car Fill Bin.

Bin vibrators (6 units) and controller, 230 V.

"C" Battery Ovens

2 - Coal Larry Cars - modernized (drop sleeves, etc.)

1 - Combination Coke Pusher, Coal Leveler and Door Extractor (modified for "C" battery) Willman-Sever-Morgan.

Pusher drive	- 45 HP 230 V.D.C.
Ram drive	- 80 HP 230 V.D.C.
Leveler bar drive	- 45 HP 230 V.D.C.
Door extractor	- 2.25 HP 230 V.D.C.
Door extractor motor	- 5 HP 230 V.D.C.

Coke Side: Door Machine Lift - 15 HP 230 V.D.C.

Coke Guides Tractor Motor - 16 HP 230 V.D.C.

2 - Recording and Indicating Pyrometers (waste heat temperature).

Breaker Building

Magnetic Pulley - 30" dia., 38" crown face, permanent magnet, - Stearns Magnetic Products.

Hammermill, 400 HP, 2300 V. Pennsylvania Crusher Co.

Bedford Breaker, 100 HP, 230 V.D.C., Heyle & Patterson Oil Meter - to control bulk density.

Rectangular magnet, 42" wide x 431" x 21½" high for coal handling, 230 V.D.C., Schrader Magnetic Equipment.

Coal Mixer Building

Proportional Mixer, 25 HP motor, 230 V., 21 cast iron paddles per shaft, bin size = 4'-0" wide x 4'-3" long x 4'-8" high.

Mixer bins, (4 units) 20 ft. sq., 250 ton capacity.

Vibrators, 230 V., Syntron Co.

1800 ton Larry Car Fill Bin.

Bin vibrators (6 units) and controller, 230 V.

"C" Battery Ovens

2 - Coal Larry Cars - modernized (drop sleeves, etc.)

1 - Combination Coke Pusher, Coal Leveler and Door Extractor (modified for "C" battery) Willman-Sever-Morgan.

Pusher drive	- 45 HP 230 V.D.C.
Ram drive	- 80 HP 230 V.D.C.
Leveler bar drive	- 45 HP 230 V.D.C.
Door extractor	- 2.25 HP 230 V.D.C.
Door extractor motor	- 5 HP 230 V.D.C.

Coke Side: Door Machine Lift - 15 HP 230 V.D.C.

Coke Guides Tractor Motor - 16 HP 230 V.D.C.

2 - Recording and Indicating Pyrometers (waste heat temperature).

Concrete Mixer - Western Products, Douglas Dynamics Corporation, 6 cu. ft. capacity (1973).

Closed Circuit Television for Stack (Installed 1972).

1 - Model T-5916 Magnavox 23" monitor
1 - Model WV-200P Panasonic camera
1 - Model V-75-1.8 75 mm telephoto lens

Monitor located in main gate office.

Regulators on stack draft and fuel pressure, (1 each) Askania Regulator Co. (1953).

Equipment and Control in the Gas Reversing Building

Gas and Air Reversing Machine - Wilputte (1953).

Fuel Gas Heater - Wilputte (1953).

Gas Meter - M.E.A. thermal flow probe unit, range 30,000 to 300,000 SCFM (1974).

Stack Draft Recorder, 24 hr. chart, range 0-40 mm diff.

Fuel Gas Pressure Recorder, 24 hr. chart, range 0-150 mm.

Basement Draft, Pointer Gage Indicating Gage, range 0-10 mm water.

Fuel Gas Temperature Recorder, 24 hr. chart, range 50^{o}-150^{o}F.

Waste Gas Temperature Recorder, iron-constantin thermocouple, 24 hr. chart, range 0 to 800^{o}F.

"C" Battery Pusher Ampere Recorder, range 0-1500 amps, 120 V.

"C" Battery Heated Fuel Gas Temperature Recorder, range 30^{o}-210^{o}F.

Hayes Dry Type Portable Gage, range 0 to 10 mm water lower scale and 0 to 50 mm water upper scale, Hayes Corp.

"C" Battery Bacharach (spare used for checking), range 10 to 25 mm water.

Regulator for Basement Draft Air Control on Wind Boxes, range 10 to 22 mm water, Askania.

Pump Motor: 0.5 HP
Recorder range: -10 to +25 mm

Decarbonizing Combustion Air Blower, fan and 3 HP motor.

Pump for Askania Controls, (2 units). DeLaval Pump Co.

Pump Drive, 1 HP motor, 0.75 HP steam turbine.

Sump Pump with automatic float switch, 75 GPM @ 25 ft. TDH with 1.5 HP motor.

Collector Main Pressure Recorder, range -10 to +25 mm water..

Gas Regulator on Collector Main -- Askania with pump and 0.5 HP motor.

Vibrators on Coal Hoppers, (4 units), Syntron Corp.

"C" Battery - Combination Coke Pusher, Coal Leveler and Door Extractor Machine.

Door Extractor - Hydraulic operated, Wilputte, Vickers combination pump and valves with 10 HP motor.

Combined Coke Guide and Door Extractor, Wilputte Traveling Motor - 10 HP @ 4.5 amps, 1 hr. 13½" @ 5.7 amps, 30 min.

Hydraulic Oil Pump and Motor - same as on Pusher Door Extractor.

Vacuum Cleaner, Spencer Turbine Co.

Electric Power Equipment Building

Contents of Control Room:

1 - Six panel switch board
1 - Circuit breaker for the following:

Incoming feeder
Quenching locomotive
Larry car
Pusher
C.S. door machine
1 - panel for 5 Westinghouse indicating D.C. ampere gauges for the following:

Incoming feeder
Quenching locomotive
Larry car
Pusher
C.S. door machine

Storage Batteries (2 units) and Battery Charger.

Transformer, 440 V.A.C. to 220 V.A.C.

Coke Oven Gas Detection and Reaction System.

Liquid Nitrogen storage unit (for purge gas).

Coke Ovens Stand-by Gas Supply, (for underfiring) 30,000 gal. propane tank, vaporizer, and air mixing system.

Diesel Fuel Tank and Fill Station, (for yard equipment).

COKE HANDLING

Quench Tower

20,000 gal. water tank and valves, quench valve and controls, Clayton Mfg. Co.

2 - Quench Cars, cap. = 10 tons, equipped with quench spray system (pump, motor, 538 gal. tank and nozzles).

1 - Quench Car Locomotive, 20 ton unit, G. E. Mfg.

Closed Circuit Communications System (3 units), Stations - quench car, and pushers at coke ovens.

Quench Station Pump House

2 - Pumps, 1150 GPM @ 80' Head, and 50 HP motors.

Coke Wharf

Air driven sump pump.

Car Pull, motorized car spotter, 230 V.D.C. Link Belt Co.

System of Conveyor Belts

Coke Screening Station

Primary Shaker and Crusher, gyrex crusher, 30 HP motor, 230 V.D.C., Robins Conveyor Co.

Screen, gyrex, 7½ HP motor, 230 V.D.C.

2 - Dust Collection Systems (2-cyclones, 2-blowers, 2 - 15 HP motors, 230 V.D.C.).

Sizing Shaker, 3 Deck Gyrex, 10 HP motor.

BY PRODUCTS PLANT

Pump Room

2 - Hot Drain Pumps and 7½ HP, 230 V.D.C. motor.

Tar Pump, 188 G.P.M. and 15 HP motor.

2 - Flushing Liquor Pump, 1670 G.P.M. @ 115 ft. head

1 - 75 HP, 2300 V. motor
1 - 60 HP, steam turbine and controls

Wash Oil Circulating Pumps, (3 units) 10 HP motors and controllers.

Ammonia Still Room

Water Pump for Fire Protection and Booster Pump. 1000 G.P.M. @ 243 T.D.H. and 110 HP steam turbine drive.

Engine and Crystal Unit Room

1 - Allis Chalmers, 28,200 CFM @ 110° F., suction = 13.35 PSIA., discharge = 4 PSIG; 785 HP, 140 PSIG, Worthington Turbine.

2 - Connerville, 12,580 CFM., piston type blower; Buckeye reciprocating steam engines.

2 - Exhauster Automatic Controls, (Askania Regulator Co.).

2 - Pumps for Askania Regulators

1 - 1 HP motor (1730 R.P.M.)

1 - 3/4 HP steam turbine (1750 R.P.M.)

By Products Exhauster Control Board, contains following recorders:

1 - Exhauster Vacuum on extra turbine, range 0 to 30" Hg Vac.

1 - Exhauster Pressure, 2 pens, after exhauster and before final cooler.

1 - Exhauster Suction, 2 pens, before primary coolers and before exhausters, range 0 to 800 M/M W. Pr.

1 - Gas Temperature, before exhauster, range 0° to 150° F.

Oil Pump - Oiling System on Exhauster on slow operation (1 unit) 3/4 HP motor, oil cooler, oil filter (2 units) and tachometer generator.

Tar Precipitators (Electrostatic) 2 units, capacity = 17,500 C.F.M. @ inlet conditions, (each); with control panels; Research-Cottrell, Inc.

Gas Reheater, (1 unit), working press, gas side 10 P.S.I.G. steam side 15 P.S.I.G.

Ammonia Absorber, Graver Tank & Mfg. Co.

Crystallizer (Sulphate), will be removed.

Vaporizer (Sulphate), Colonial Iron Works.

Controls for Sulphate System, main switch, high and low level, steam and water pressure, gauges, etc.....with lights and horn signals.

No. 1 Pump - capacity 210 G.P.M. @ 62' T.D.H. (mixing tank to ammonia absorber), 7½ HP 230 V motor and switch.

No. 2 Pump - capacity 210 G.P.M. @ 62' T.D.H. (scrubber to crystallizer), 7½ HP 230 V motor and switch.

No. 3 Pump - capacity 2500 G.P.M. @ 4' T.D.H. (crystallizer to vaporizer), 10 HP 230 V motor and switch.

No. 4 Pump - (on top of crystallizer to slurry tank) 1 HP 230 V motor and switch.

Wilputte Instrument and Board

Solution temperature to vaporizer; thermometers, manometers and gauges.

The following equipment is located in the Engine and Crystal Unit Room, but not being operated:

Pyridine Still, Tank and No. 1 Booster and Buckeye Engine.

No. 3 Booster capacity 14,100 C.F.M. @ 308 R.P.M., 12.5 P.S.I.G. (Roots-Connersville); turbine drive 1029 HP @ 3700 R.P.M., steam pressure = 140 P.S.I.G. (Worthington) with speed reducer and tachometer.

Booster Chart Board (Wilputte)

The following are located in the panel:

1. By Product Steam Recorder, range 0 to 180 P.S.I.

2. Booster Steam Turbine Vacuum Recorder, range 0 to 30" Hg

3. Tagsteam Pneumatic Controller, range 0 to 200 P.S.I.

4. Low Pressure Steam Pneumatic Controller, range 0 to 15 P.S.I.

5. Booster Gas Discharge Pressure Recorder, range 0 to 15 P.S.I.

6. Surplus Gas Holder Recorder, range 0 to 10 - 6.75 to 14 P.S.I.

By Products Valve Positioner on Tag Steam, for 80 P.S.I. steam and Bristol Valve Positioner and motor.

Low Pressure Steam Regulator Valve Positioner

Low Pressure Steam Relief to Atmosphere Valve Positioner

Crane, capacity 5 tons , air driven - Whiting

By Products Telephone System, 4 stations.

Barometric Condenser for Crystal Unit, 26" size, (Schutte & Koerting) and secondary condenser.

Sulphate Storage Room

Mixing Tank

The following equipment is there but not used at the present time:

Slurry-Tank, Centrifugal Dryer, 5 ton Crane, & Main Crane.

Primary Coolers, (4 units), Koppers Mfg. Retubed Units #1, 2 & 4. 1976 and Unit #3 1974.

Decanters, (2 units), Cleaner Bucket Drive Motor 5 HP 230 V.D.C.

Hot Drain Tank, capacity 2000 gal.

Flushing Liquor Tank, capacity 12,500 gal.

Direct Operational Liquid Level Controller, size 1½", 8" stainless steel float.

Automatic Liquid Strainer, size 10", S. P. Kinney Co.

Barometric Condenser - for the exhauster, size 13½" dia. x 41-3/8" high, Schutte & Koerting.

Two Stage Steam Jet Vacuum Pump on Barometric Condenser, Schutte & Koerting.

Barometric Condenser & Two Stage Steam Jet Vacuum Pump for Booster, Schutte & Koerting.

Closed Recirculating Water System for Final Coolers.

Final Coolers, (4 units) 4 - in service - use 2 Koppers units and 2 Wilputte units.

Cooling Tower, single flow, two cells, 2-5 HP pump motors, 460 V and valves, Morley Co.

Acid Storage Tanks, 4 tanks, 1 - in service and 3 - not in service, Koppers Co.

Benzol Washers, 4 units, Koppers Co.

Pyridine Storage Tank, Buffalo Tank Co.

Gas Holder, 2 units, capacity 20,000 FT^3 (each) 33' - 3" I.D. x 28' - 0" high, gas press = 14" H_2O, Koppers Co.

Ammonia Storage Tanks, 2 units, capacity 60,000 gal., 20' x 0" I.D. x 27' - 0" high, Koppers Co.

Tar Production Tank, 4000 gal., 12' - 0" long x 8' - 0" wide x 8' - 0" high.

Tar Storage Tanks, 2 units, capacity 230,000 gal. each, 41' 6" I.D. x 24' - 6" high, steam coils in bottom, Koppers Co.

Tar Storage Tank, 1 unit, capacity 83,000 gal., 22' - 0" I.D. x 31' - 0" high, Koppers Co.

Gas Bleeder, 2' - 0" I.D. x 100' - 0" high, manual ignition.

Combustible Gas Indicator, Mine Safety Appliance Co.

Railroad Tank Cars, 2 units, capacity 8000 gal., coiled, not suited for road service.

Base Volume Indexes at Edison Co., 2 units, 1 - in service, 1 - needs repairs, instrument driven gear boxes, Roots-Connersville.

Surplus Gas Meters at Edison Co., 2 units, capacity 317,000 cu. ft. per hr. @ 1" diff., size 18 x 54, Roots-Connersville.

Time, Temperature and Volume Recorders, range 30° to 180°F., 0 to 15# press., Model No. 340-M, Bristol Co.

Final Cooler Pump House

Pump, 1500 GPM @ 70' head, 75 HP 230 V.D.C. motor.

Fuel Gas Calorimeter House

Calorimeter, range 0 to 700 B.T.U., 1/8 HP 115 V. motor, Cutler-Hammer.

Transformer (calorimeter) on motor, reduce 230 V. to 115 V.

Rotary Meter (measure gas to coal and coke handling in winter time) capacity 1,000,000 cu. ft. per day - size 10 x 30, Roots-Connersville; not used at present time.

Purifier Tank, 1 unit, remove sulphur before coke handling gas system.

Water Separator Gas Tank.

Substations

Tar Precipitator, Auxiliary Precipitator, Calorimeter Bldg. & Coke Plant.

BENZOL & LIGHT OIL PLANT

The benzol plant was shut-down Nov., 1977. The crude benzol is now being sold. The benzol processing equipment is mostly intact. The light oil processing equipment is in operation.

Continuous Light Oil Still, 13 trays, capacity is based on carbonization of 1600 tons/day or 16,000 gals. of wash oil circulated per hour, Wilputte Corp.

Heat Exchangers, (2 units) maximum working pressure - steam 125#, water 350#.

Light Oil Dephlegmator, 6 trays, capacity light oil produced from 135 ovens per day, Wilputte Corp.

Light Oil Still Instrument Panel includes the following:

1. Vapor pressure at bottom of L.O. Still Recorder, range 0 to 15#.
2. Vapor temperature out of L.O. Still, range 0° to 145° C.
3. Vapor temperature out of L.O. Dephlegmator, range 0° to 145° C.
4. Oil Temperature in L.O. Still, range 0° to 145° C.
5. Wash Oil Flow Meter, range 0 to 16,000 G.P.H.
6. Steam Flow Meter to L.O. Still, range 0 to 16,000 lb. per hr.
7. Tag Steam Pressure to L.O. Still, range 2 to 30#.
8. Water to L.O. Still Dephlegmator, range 75 to 120°,C.
9. Various pressure gauges.

Light Oil Condensers (2 units), 12' - 0" wide x 6' - 0" high x 12' - 0" long steel tank.

Decanter, 4' - 3" I.D. x 14' - 3" high, Wilputte Corp.

Secondary Decanter, capacity 6750 gals., Wilputte Corp.

Secondary Storage Tank No. 23, capacity 6360 gal. Wilputte Corp.

Decarbonizing Hot Wash Oil Decanter, 8' - 0" wide x 9' - 6" high x 30' - 0" long, Wilputte Corp.

Cold Wash Oil Decanter, 9' - 6" I.D. x 9' - 0" high, capacity 5250 gal.

Sludge Tank, steam coils, 4' - 0" I.D. x 10' - 3" long.

Oil Out Temperature at Cooler Coils Recorder, range 0 to 150° F.

Cold Tank No. 19, capacity 18,694 gal., 10' - 0" O.D. 30' - 0" high, Kopper Co.

Hot Tank No. 20, capacity 12,600 gal., 12' - 0" wide x 5' - 0" high x 28' - 0" long, Koppers Co.

Light Oil Tanks.

No. 11 capacity 12,000 gals., 10' - 0" I.D. x 20' - 5" long
No. 12 capacity 3,000 gals., 10' - 0" I.D. x 5' - 1" long
No. 13 capacity 5,000 gals., 10' - 0" I.D. x 8' - 6" long
No. 14 capacity 20,000 gals., 10' - 0" I.D. x 34' - 0" long
No. 15 capacity 10,000 gals., 10' - 0" I.D. x 16' - 0" long
No. 16 capacity 1 - 20,000 gal., 10' - 4" I.D. x 38' - 4" long
" 2 - 10,000 gal., 8' - 0" I.D. x 30' - 8" long
No. 17 capacity 50,000 gals., 17' - 0" I.D. x 31' - 0" long
No. 18 capacity 50,000 gals., 17' - 0" I.D. x 31' - 0" long
Benzene Tank No. 24 capacity 1,000,000 gals., 60' - 0" I.D. X 48' -0" high

The benzol equipment is in the plant but is not being operated.

Crude Benzol Still #1, capacity 8000 gals., 10' - 0" I.D. x 16' - 8" long, steam coils, Koppers Co.

Receiver, 2 units, capacity 270 gals., 42" I.D. x 4' - 0" high, Koppers Co.

#1 Crude Still Temperature Recorder, range 0° to 150° C.

#1 Crude Still Pressure Recorder, range 0 to 30" Hg.

Crude Benzol Column #1, 12 sections, 4' - 0" I.D. x 13' - 1½" high Koppers Co.

Crude Benzol Dephlegmator, 5 units, 9 baffle plates, 3' - 9½" - 11¼" x 4' - 7¼", Koppers Co.

Crude Benzol Condenser Shell or #1 Boiler Still, 3' - 0" I.D. x 14' - 2½" high, Koppers Co.

Pure Benzol Stills & Columns #2, 3 and 4, 3 each, capacity 8000 gals., 10' - 0" I.D. x 16' - 8" long.

Pure Pump, capacity 20' G.P.M., size 7" x 6" x 10", Fairbanks-Morse.

Crude Benzol Pure Stills Instruments:

#2 Pure Still Temperature Recorder, range 0° to 150° C.

#2 Pure Still Pressure Recorder, range 0 to 110" H_2O

#3 Pure Still Temperature Recorder, range 0° to 150° C.

#3 Pure Still Pressure Recorder, range 0 to 110" H_2O

#4 Pure Still Temperature Recorder, range 0° to 150° C.

#4 Pure Still Pressure Recorder, range 0 to 110" H_2O.

Pure Still Dephlegmator, 4 units, one each still size 3' - 9½" x 2' - 11¼" O.S. x 4' - 7¼", 9 baffle plates, Koppers Co.

Pure Still Condenser Shells, 3 units, #2, 3 and 4, size 3' - 0" I.D. x 9' - 6" high.

Pure Still Receiving Tanks, 6 units, 2 each still, capacity 500 gals. 4' - 6" I.D. x 4' - 10½" high.

Pure Still Residue Removal Unit - #5 Still, capacity 450 G.P.H., 12 bubble trays, 2' - 0" I.D. x 25' - 0" high, Wilputte Corp.

Residue Settling Tanks, 2 units, 4' - 0" I.D. x 4' - 0" high with cone bottom.

Residue Pump, Duplex Steam, size 3 x 2 x 3.

Residue Pump Tank, capacity 500 gals., 4' - 0" I.D. x 7' - 0" long.

Residue Pump, capacity 7 G.P.M. @ 80' head.

Pump Drive, 1.5 HP @ 2100 R.P.M. steam turbine, Coppus Engine Co.

Pure Still Instrument Panel:

1. Pure Still Flow Meter, range 0 to 500 G.P.H.

2. Indicating Pressure Recorder, range 0 to 5 P.S.I.

3. Pure Still Temperature Recorder, range 10° to 105° C.

4. Indicating Thermometer, range 0° to 110° C.

Benzol Plant Steam Recorder Flow of all steam used at benzol plant, range 0 to 250#.

Benzol Steam Pressure Recorder, range 0 to 210 P.S.I.

Benzol Shipping Station, dock 14' - 9" wide x 40' - 2" long.

Benzol Pump and Toluene Loading Pumps, 2 units, size 6 x 7½ x 6, steam duplex pump, capacity 5,000 G.P.H. @ 18 strokes per min.

Drum Service Tanks, for loading drums, 3 units, capacity 500 gals. each, 3' - 6" I.D. x 8' - 0" long.

Pure Benzol Pump, to tank cars and storage tanks, size 7 x 7¼ x 8, steam duplex.

Drum Loading Scale, capacity 3100 lbs., set flush in the floor.

Oleum Blow Tank, capacity 25 gals., 2' - 0" I.D. x 2' - 0" long.

Washed Benzol Storage Tanks No. 21 & 22, capacity 11,000 gals. each, 10' - 6" I.D. x 13' - 3" long.

Pure Heavy Solvent Tank, capacity 700 gals., 4' - 6" I.D. x 6' - 5" high.

Benzol Deep Well, for cooler coils, 8" dia. approximately 400 ft. deep, min. air press. to operate 75 P.S.I.

Well Booster Pump capacity 37.2 G.P.M., size 4½ x 3-3/4 x 4, duplex steam pump.

Car Pull, capacity 5000 lbs.

Crude Benzol Toluene and Xylene Agitator, capacity 5250 gals., 9' - 6" I.D. x 9' - 0" high, with cone.

Drive, vertical E, size 6½" x 7", E. H. Wachs Engine.

Pure Still Residue Removal Unit: following is used in Light Oil System.

Condenser, drip type, 400 sq. ft.

Decanter, size 2' - 6" I.D. x 5' - 10" high.

Wash Oil Circulating Pumps, 3 units (1 spare) capacity 250 G.P.M. @ 250' T.D.H., Drives, 25 HP motor and 25 HP steam turbine.

Air Receiver at Benzol, 150 lb. press., 2' - 8" I.D. x 6' - 0" long.

Twin Water Screens, size 6, Elliott Co.

Turbine Driven Water Pump, capacity 500 G.P.M.

Turbine, 16 HP @ 3500 R.P.M., 6 nozzles, Coppus Engine Co.

Sulphuric Acid Storage Tank, capacity 14,000 gals., 9' - 9" I.D. x 36' x 9" long, Koppers Co.

Caustic Soda Storage Tank, capacity 1400 gals., 4' - 6" I.D. x 11' - 9" long, Koppers Co.

Caustic Soda Mixing Pan, size 4' - 0" x 6' - 0" x 2' - 6½" open top, Koppers Co.

Sulphuric Acid Agitator Pump House

Acid Pump, size 2" intake and discharge.
Acid Pump Drive, 2.5 HP @ 1750 R.P.M. turbine

Naphthalene Building

Pit Pump, capacity 7.7 G.P.M., size 3 x 2 x 3 duplex steam pump.

Miscellaneous Building

Benzol Lab., one story brick building, 15' - 11" x 30' - 0", contains lab, locker room and shipper's office.

Benzol Storage Building

43' - 0" wide x 155' - 3" long x 23' - 3" at the eaves, with brick and corrugated steel side walls. This building contains the following storage tanks that were used in the processing of benzol and light oil:

Benzol Process Tanks:

No. 1 capacity	100,000 gals.,	34' - 0" I.D. x 15' - 0" high
No. 2 capacity	10,000 gals.,	16' - 0" I.D. x 10' - 0" high
No. 3 capacity	10,000 gals.,	10' - 0" I.D. x 16' - 0" high
No. 4 capacity	20,000 gals.,	10' - 0" I.D. x 34' - 0" high
No. 5 capacity	10,000 gals.,	10' - 0" I.D. x 17' - 0" high
No. 6 capacity	10,000 gals.,	10' - 0" I.D. x 17' - 0" high
No. 7 capacity	20,000 gals.,	10' - 0" I.D. x 34' - 0" high
No. 8 capacity	10,000 gals.,	10' - 0" I.D. x 16' - 0" high
No. 9 capacity	10,000 gals.,	10' - 0" I.D. x 17' - 0" high
No. 10 capacity	20,000 gals.,	10' - 0" I.D. x 34' - 0" long

Coke Oven Office - supervisor's office, record room, master mechanics office.
Storeroom
Shop - machine, pipe and blacksmith
Electrical switch room
Storage shed and welding shop
Storage building
Labor's and carpenter shop

Gate house, locker and shower room, garages, yard toilets and women's locker room.

Yard Equipment

Automatic Gate, 18" wide x 9' high with 14' clear. 3/4 HP motor, limit switch and starter.

Miscellaneous Mobile Yard Equipment;

1 - Front End Loaders
1 - Roustabout Crane (Cherry Picker)
1 - Bobcat Loader
1 - Electric Locomotive (Diesel)
1 - Diesel Crane and Bucket
1 - Fork Lift
46 - ICX Coal Hopper Cars (16 new and 30 various condition)
7 - ICX Tank Cars (2 useable amd and 5 poor condition)

Electrical:

Coke Plant Gate House and Locker Room (Service Station Area):

Transformer, high voltage 240/480
low voltage 120/240

Transformer, Road Tar Plant Area,
high voltage 240/480
low voltage 120/240

Transformer, Calorimeter Building Substation,
high voltage 240
low voltage 480

Transformer, Calorimeter Building (Auxillary),
high voltage 480
low voltage 240

Tar Precipitator Substation Building.

Electrical Shop, Electric Switch Room Switchboard,

Circuit Breakers, 8 units

Switch Panels with ITE circuit breakers for the following:
Coke Handling, Quench Loco., "C" Battery Coal Handling, France Slag By-Products & No. 1 Pusher, Ovens, Quench Station, Larry Cars, and Machine Shop and Door Machines.

Individual Open Knife Switches for Lights as follows:
Coal Handling, Benzol, Battery By Products, Yard, Service Station, Machine Shop, Coal Handling Shed, Coke Handling, and Bench Lights.

D. C. Watt hourmeter to France Slag Co.

Transformer, high voltage 460/230
low voltage 230/115

Pusher Recording Ammeter, range 0 to 1500 amp.

Water System

Coke Oven Sanitary Sewer

This sewer system empties directly into the 72" city line via a 12" line. A pit approximately 100' from point of discharge contains the flow metering and temperature regulating and recording systems. A 3" plant water line connected to the 12" line in the pit, serves as a means of cooling sewage

to the required 100° F. Sewage is metered by means of an 8" Foxboro magnetic flow meter located in this pit.

Magnetic Flow Meter, Foxboro, range 0 to 1,500,000 gals./day.

Temperature Recording Equipment, swaged thermocouple, range 0° to 300° F. L & N Speedomax, Taylor Recording Thermometer, range 30° to 200° F.

Lift Station #4, south of lean and rich gas holders, Yeomane Brothers Co. ejector (air), capacity 50 gals.

Fire Protection System

Fire Pump House:

Pump capacity 1000 GPM @ 243 ft. head.
Pump motor 100 HP 230 V.D.C., 1750 R.P.M.

Fire Hose Storage:

Equipment, hose cart, foam mixing cart, hoses, foam supply and fire fighting equipment.

Fire Protection for Benzol Storage Tanks, foam equipment, hoses, foam supply and fire fighting equipment.

Fire House #3 and #4 serve this area.

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1972 Operations

vessels. These agreements are generally on a year-to-year basis and cancellable at their anniversary dates upon 30- to 60-days notice. During 1972 the aggregate tonnages handled over these docks were approximately 7,000,000 long tons of iron ore and 8,500,000 net tons of coal.

Principal and Broker Sales and Related Operations

Coal. During 1972, Pickands purchased and resold as a broker approximately 1,385,000 net tons of coal, and also sold approximately 137,000 net tons of coal from its own properties which terminated operations during the year.

Coke. The Milwaukee Solvay Coke Co., a Pickands division, owns a foundry coke plant in Milwaukee, Wisconsin. The plant is located upon approximately 46 acres, fronting on the Kinnickinnic River. In 1972, this Division employed approximately 330 employees and operated approximately 200 coke ovens which produced approximately 311,000 net tons of foundry and other coke, and related by-products. All of the product was sold on the open market, the coke primarily to various foundry operators and the by-products to others. The principal raw material used in the manufacture of coke is metallurgical grade coal. Pickands has encountered no difficulty in obtaining at prevailing market prices an adequate supply of raw materials for the plant. The plant during 1972 operated at approximately 80% of capacity. On February 1, 1973, operation of 50 obsolete ovens was discontinued and operation of an additional 50 such ovens is scheduled for discontinuance prior to May 1, 1973. After these discontinuances, the plant will have the capacity to produce annually about 235,000 net tons of product.

Iron Ore. During 1972, Pickands sold on the open market approximately 518,000 long tons of iron ore received from Wabush Mines and Hilton Mines through its ownership participation in these projects. See "Management of Properties—Iron Ore" above.

Limestone. The Carbon Limestone Company, a Pickands division, has quarrying and processing operations located in adjoining areas of eastern Ohio and western Pennsylvania, near Youngstown, Ohio, on properties owned or held under leases which expire between 1977 and 1997. This Division has approximately 230 employees. During 1970 it produced 1,540,000 net tons of limestone and 122,000 net tons of by-products (coal, fire clay and fertilizer); in 1971 it produced 1,508,000 net tons of limestone and 117,000 net tons of by-product and, in 1972, 1,760,000 net tons of limestone and 130,000 net tons of by-product. About one-half of the limestone and most of the other products are sold on a year-to-year basis principally to iron and steel, and chemical companies. The remainder of the limestone is sold either on a spot basis or as required for a specific project. It is estimated that limestone reserves are sufficient for at least 30 years of operations at the normal production rate averaging 1,500,000 net tons per year. In addition, Carbon owns four concrete block plants with a productive capacity in excess of 6,000,000 units per year. The product of the block plants is sold in the open market to customers in the building and construction industry located near the plants. The Carbon block plants are being operated at approximately 118% of capacity.

Marketing. Pickands employs 54 persons engaged in the marketing of iron ore, coal, pig iron, ferroalloys and coke, including fuel engineers, service engineers, salesmen, inspectors and customer representatives. Sales offices are maintained in nine cities located east of the Mississippi River. The Carbon Limestone Company Division maintains its own organization consisting of 9 persons for sales of its products in the Youngstown area.

Agency Sales

Pickands sells coal, pig iron, ferroalloys, coke and Massive Manganese for the account of others pursuant to sales agency agreements, generally terminable on one year's notice under which it is paid a commission based on the sales price. Pickands is the exclusive sales agent for all merchant pig iron, coke and ferroalloys produced by Interlake, Inc. and, during 1972, sold approximately 651,000 net tons of merchant pig iron, 74,000 net tons of coke and 68,000 net tons of ferroalloys. Pickands also sells coke and Massive Manganese for Diamond Shamrock Corporation. During 1972, as sales agent, it sold commodities having an aggregate sales price of approximately $111,000,000 including approximately 4,000,000 net tons of coal which constituted approximately $30,000,000 of such aggregate sales price. See "Principal and Broker Sales—Marketing" above.

Investments

Among the principal investments and other assets of Pickands and its subsidiaries as of December 31, 1972 are:

(a) An interest of 5.2% in The Wabush Mines joint venture representing a cash investment by Pickands of $4,573,375.

(b) An interest of approximately 24% in The Savage River Mines joint venture representing a cash investment by Pickands in the capital stock of one of the 50% joint venturers of $2,794,249, and an additional $435,188 ($344,635 after depletion) in royalty producing mineral property rights at Savage River Mines.

(c) A 25% interest in The Hilton Mines joint venture representing a cash investment by Pickands of $200,000.

(d) Various agreements pursuant to which Pickands is entitled to receive payments measured by tonnages of iron ore and coal produced and shipped. The amount of such payments received during 1972 aggregated approximately $1,000,000 as to iron ore and $50,000 as to coal. It is estimated that payments pursuant to agreements respecting iron ore will continue at approximately the current annual rate until the iron ore contained in these properties is exhausted or the leases terminated. When the coal properties currently under development reach capacity in 1974, the total amount of payments relative to them should be increased by $350,000.

(e) A 12½% interest in The Beckley Mine representing a cash investment by Pickands as of December 31, 1972 of $1,000,000.

Exploration

Pickands is regularly engaged in exploration for various minerals in North America and overseas.

IRON PROPERTIES

Seignelay Properties, Quebec. Pickands holds a 50% ownership interest in a group of properties located approximately 200 miles from the nearest ore shipping facilities on the St. Lawrence River in the northeastern part of the Province of Quebec, Canada. As a result of field exploration and metallurgical test work conducted on these properties over the period from 1958 through 1962, Pickands estimates that the properties contain material averaging 30% iron and sufficient for the production of approximately 200,000,000 tons of iron ore concentrates. Test work has shown that approximately 2.7 tons of the crude material, which can be mined by surface methods, will be required to produce, with conventional technology, one ton of concentrates containing approximately 65% iron, which can be used either for sinter feed or can be pelletized. The test work has further demonstrated that the concentrates can be further up-graded by conventional technology to serve as feed for a direct reduction process. There are presently no definitive plans for commercial development of these deposits.

Because of the remote location of these properties, their commercial development, as in the case of the Erie and Wabush projects (see "Management of Properties" above), would involve expenditures of the order of several hundred million dollars which would include provision of housing for employees and transportation facilities for the product. The investment of Pickands in this project as of December 31, 1972, is $1,450,000.

Hibbing Taconite Project. Pickands has managed the preparation of a feasibility study for a taconite project near Hibbing, Minnesota. The study covers properties owned or held under lease by three companies, beneficially owned by several corporations in varying interests. In the lands held by one of these companies, Pickands has a 30% beneficial interest and a domestic steel producer holds the remaining 70%. Discussions have been held among the stockholders of the three companies seeking to find an acceptable basis for pooling the lands held by the companies, but no formal agree-

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1973/74 Comparison

Milwaukee Solvay Coke Co.
A Division of Pickands Mather & Co.

P/L Review of First Nine Months of 1974

An across the board comparison of the first nine months of 1974 to the first nine months of 1973 is not too meaningful for the following reasons:

1. 100 Koppers ovens were shut down permanently in February and March of 1973.

2. A strike of almost three weeks duration occurred in May, 1973.

3. Cost of coal rose at a very rapid rate during 1974.

4. Prices of coke and tar were raised frequently to try to keep up with rising coal costs.

The changes listed below had a significant effect on 1974 results.

1. Because of high demand for coke of all sizes, in February, 1974 we began selling all coke over 3" in size as foundry coke and all coke 1" x 3" in size as stove or sugar beet coke. We also did some remodeling of our coke screening operation which increased yield. Both of these changes contributed to a consistently greater amount of coke being sold at foundry coke prices.

2. In June, 1974 we shut down our "domestic" or small size coke screening operation. The screening was transferred to the foundry screening area and the pea coke became part of breeze with the net result of reducing manpower by four and cutting out a considerable amount of equipment.

3. The effect of #1 and #2 above, combined with a Solvay oven only operation for all of 1974, gave the following beneficial results:

	1974		1973	
	Tons	Yield % of Coal	Tons	Yield % of Coal
Coal Charged	220,383		240,522	
Foundry coke	140,059	63.6	132,625	55.1
Crushed coke	26,017	11.8	42,223	17.6
Breeze	16,381	7.4	22,546	9.4
Total coke	182,457	82.8	197,394	82.1

4. A change in pricing policies was in effect during 1974. While price controls were in effect, all increased costs were not recoverable. With frequent and substantial price increases on coal hitting us after price controls were lifted, we found it necessary to compute the expected cost of coal in advance each month and raise the prices of coke to cover our costs. While much of the time we ended up with the highest price coke in the industry, we were able to do so because of coke demand. Prices of tar were also increased substantially during 1974, following a formula based on coal costs.

5. Price comparisons:

	September 1974	December 1973	% Change
Coal - ton	$ 51.12	$ 23.19	+ 120%
Foundry coke - ton	$101.43	$ 57.58	+ 76%
Crushed coke - ton	$ 72.28	$ 32.52	+ 122%
Tar - gal.	$ 0.331	$ 0.129	+ 157%

Note: Plant operating costs for nine months of 1974 were up 15.4% over 1973.

Conclusion:

Improved coke yields and good business conditions made 1974 a good year.

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PICKANDS MATHER & CO.

REPORT OF INTERNAL AUDIT

Review of the System of Internal Control
and Accounting Procedures Relating to
the Coal and Coke Inventories at
Milwaukee Solvay Coke Co.

November 1975

MOORE MCCORMACK RESOURCES, INC.
ONE LANDMARK SQUARE
STAMFORD, CONNECTICUT 06901

PICKANDS MATHER & CO.

REPORT OF INTERNAL AUDIT

Review of the System of Internal Control and Accounting Procedures Relating to the Coal and Coke Inventories at Milwaukee Solvay Coke Co.

November 1975

TABLE OF CONTENTS

I. INTRODUCTION

We have reviewed the system of internal control and accounting procedures relating to the coal and coke inventories at Milwaukee Solvay Coke Co. (the plant), a division of Pickands Mather & Co. (PM). As part of our examination, we also reviewed the adequacy of the procedures utilized in taking a coal physical inventory.

II. OVERVIEW

This section is included in this report primarily to provide the reader with certain financial and other background information concerning the plant and its inventory system.

- The Plant

  The Milwaukee plant manufactures foundry and other coke and related by-products (tar). It produced approximately 114,000 tons of foundry coke during the first nine months of 1975 from its 100 coke ovens.

  The primary raw material in the manufacture of coke is coal which is stored at the plant on an 8 acre coal storage field. The coal storage field has a maximum storage capacity of approximately 400,000 tons.

- Financial Information

  The following is selected financial information concerning the plant's results of operations for the nine months ended September 30, 1975:

Sales	$ 14,073,000
Cost of sales	(12,425,000)
Gross profit	$ 1,648,000
Administrative, selling and general	(895,000)
State income taxes	(48,000)
Net income	$ 705,000

At September 30, 1975, coal and coke inventories amounting to $4,282,000 represented approximately 85% of the plant's total assets.

- Coal Inventory

Over the past few years the plant has been experiencing variances between coal tonnage determined by way of a physical inventory and the tonnage reflected in the accounting records. The following tabulation will summarize these variances:

	Physical inventory over (under) book inventory	
Year	Tons	Amount
1968	(3,401)	$ (43,000)
1969	(6,082)	(79,000)
1970	(9,148)	(116,000)
1971	16,724	310,000
1972	25,895	513,000
1973	6,930	149,000
1974	25,988	1,401,000
1975	3,217	201,000

These variances have been attributable to certain factors, the most significant being coal field base level.

In prior years, the plant established that the base level (ground level) of the coal field was a certain distance (approximately 56 feet) below the coal bridge. It is from the coal bridge that plant personnel make height and area measurements of the coal piles when taking a coal physical inventory; therefore, the distance between the bridge and the base level plays a significant role in determining the actual height of a coal pile.

Since the base level was established as being 56 feet from the coal bridge, plant personnel used this statistic whenever they performed a physical inventory and all height measurements were based on this. Over the years, however, the weight of the coal piles on the base made the established base level recede (sink). When this occurred, inventory underages (physical quantity less than book quantity) were being recorded in the accounts. These underages did not necessarily exist because the coal which sank below the established base level was not inventoried, i.e. height measurements which were based on 56 feet were not correct since the base level may now have been 60 feet from the coal bridge.

In order to correct this, the coal field was "mined", i.e. all coal which receded below the established base level was taken out and clay and dirt were put into the "mined" area to re-establish the base level. When this happened inventory overages (physical quantity greater than book quantity) occurred. It is estimated that approximately 45,000 tons of coal were "mined" from the coal field.

As stated previously, although there are certain other factors involved in the inventory variances, the coal field base level was the most significant.

III. OBSERVATIONS AND RECOMMENDATIONS

The following are our observations and recommendations resulting from the review of the coal and coke inventory system.

- Discount Factor

  Coal tonnage determined by a physical inventory is discounted by 5% whenever the tonnage inventoried exceeds the tonnage recorded in the accounting records. When the tonnage inventoried is less than the tonnage recorded in the accounting records, the 5% discount factor is not applied.

  The primary purpose for the utilization of the 5% discount factor is to recognize error probabilities in the physical inventory procedures. We concur with this since there are many estimates involved in performing a physical inventory of coal piles; however, we believe that the 5% discount factor should also be applied to underages (physical quantity less than book quantity) in addition to overages (physical quantity greater than book quantity) since the error probability applies equally to both. To illustrate the current policy, the following is a hypothetical example:

Type of coal	Tons: Physical inventory	Tons: Book inventory	Physical inventory over (under) book inventory
High volatile	69,000	42,000	27,000
Low volatile	27,000	33,000	(6,000)
	96,000	75,000	21,000
5% discount factor applied only to high volatile coal physical inventory (5% of 69,000 tons)			(3,450)
		Net tonnage adjustment	17,550

As illustrated above, the 5% discount factor was only applied to the high volatile coal physical inventory. The physical quantity of low volatile coal was recorded in its entirety since it was less than the book inventory. If the 5% discount factor was applied in the above example to the entire physical inventory of 96,000 tons, the adjustment to the net income, based on a coal cost of $60.00 per ton, would have been decreased by approximately $80,000.

Recommendation

We suggest that the total tonnage determined by a physical inventory be discounted by 5%.

- Bulk Density Conversion Factors

The bulk density conversion factors (pounds of coal per cubic foot) used in computing the tonnage of a coal pile have not been reviewed since 1953. These factors play a significant role in determining the total coal tonnage resulting from a physical inventory, and any distortion in these factors can lead to erroneous inventory adjustments.

Recommendation

Since a significant period of time has elapsed since the bulk density conversion factors were reviewed, we suggest that a survey be conducted the next time a physical inventory is taken to determine whether or not the factors currently in use are accurate. Furthermore, these factors should be reviewed and updated at each subsequent physical inventory.

- Safety Factor

Actual coal quantities sent daily into production are increased by a 1% safety factor. This safety factor is used to account for coal loss due to handling procedures and the elements (wind). To illustrate, if 600 tons of coal were sent daily into production, the coal loss based on the 1% safety factor would be 6 tons. Hence, cost of sales would be charged with 606 tons of coal. On an annual basis, the 1% safety factor can amount to 2,500 tons of coal which, based on a coal cost of $60.00 per ton, would represent a charge against cost of sales of approximately $150,000.

Recommendation

We suggest that the safety factor should be reduced to 1/4 of 1%. We base our opinion on the following:

- Over the past few years, coal quantities determined by a physical inventory have been exceeding the quantities recorded in the accounting records. This excess has been attributable, in part, to the 1% safety factor. As a result the interim results of operations are distorted since the inventory adjustment necessary to agree both the physical and book quantities has been offsetting the periodic charge made to cost of sales for the 1% safety factor.

- Plant personnel have been attemtping to minimize wind loss by chemically treating the coal piles.

By adopting this recommendation, we believe that the interim reporting of the plant's results of operations would be improved.

- Annual Physical Inventory

Although the current policy calls for an annual coal physical inventory, consideration has been given towards implementing a semi-annual inventory policy. The primary reason behind this is due to the significant inventory adjustments over the past few years.

While the current policy requires a physical inventory in April, when the coal tonnage is at its lowest point, a semi-annual policy would require an additional inventory sometime in November. At that time coal tonnage is at its highest level and the probability of error in the physical inventory procedures is maximized. Consequently, the risk in distorting net income through an erroneous inventory adjustment is increased.

Recommendation

We suggest that the current policy of performing an annual coal physical inventory in April be continued.

- Coke In Process

The coke work in process inventory was valued on September 30, 1975, as follows:

	Per ton
Cost of coal	$12.50
Conversion cost	11.83
Cost of coke in process	$24.33

The cost of coal used in valuing the coke in process inventory is significantly below the current cost which, for the nine months ended September 30, averaged approximately $60.00 per ton.

If current coal cost was used in valuing the coke in process

inventory, the total inventory value at September 30 would have been increased by $37,000.

Recommendation

We suggest that coke in process inventory be valued using the current cost of coal.

- Foundry Coke Inventory Valuation

The ending inventory of foundry coke is currently valued at the lower of cost or market. At September 30, 1975, market, which was lower than cost, was used to value the foundry coke inventory. To illustrate how market price was determined, the following is set forth:

	Per ton
Published selling price of foundry coke	$113.00
Selling commission at 3% of published selling price	(3.00)
Estimated handling charge in preparing coke for shipment	(1.00)
Degradation at 10% of published selling price	(11.00)
Market price of foundry coke	$ 98.00
Production cost of foundry coke	$106.00

A key element in the above computation of market price is degradation. Because of the fragile nature of coke, degradation occurs through handling procedures. In other words, 10,000 tons of foundry coke is really 8,000 tons of foundry and 2,000 tons of other coke (stove coke and coke breeze) because of degradation.

Although the degradation of foundry coke is properly

recognized in the accounts whenever a sale is made, for inventory valuation purposes it is not properly recognized. To illustrate, our suggested method of valuing the foundry coke inventory is as follows:

Type of coke	Tons before degradation	Degradation at 20%	Tons after degradation	Cost per ton	Inventory valuation
Foundry	10,833	(2,166)	8,667	$106	$919,000
Stove	-	1,408	1,408	49	69,000
Breeze	17,705	758	18,463	5	92,000
Total inventory value					1,080,000
Inventory value as computed by the plant at September 30					1,135,000
Inventory overvalued					$ 55,000

The significant differences between our computation and the plant's are as follows:

- The plant utilized a 10% degradation factor where we used a 20% factor. It should be noted that a 20% factor is used by the plant whenever a sale is made and foundry coke is prepared for shipment.
- We applied the degradation to coke tonnage whereas the plant applied it to the selling price. It should be noted that the tonnage degrades and not the selling price. Furthermore, if the degradation factor is applied to tonnage rather than selling price, cost ($106 per ton) must be used in valuing the ending inventory since it is less than market ($109 per ton), as adjusted.
- We allocated the foundry coke degradation based on the plant's estimates to stove

coke (65%) and coke breeze (35%). In the plant's computation the degradation was not allocated to the other types of coke.

Recommendation

We suggest that the plant's method of valuing the foundry coke ending inventory be changed as follows:

- The degradation percentage should be increased from 10% to 20%.
- Degradation should be applied to tons and not the selling price.
- The tonnage degradation should be allocated to stove coke and coke breeze.

* * * * * * * *

We would like to take this opportunity to express our appreciation for the cooperation and assistance we received during our review. In particular, a special note of thanks is in order for Jerry Lenz, plant vice president, and Gerry Conrad, plant controller. Their suggestions and guidance certainly aided us in our review.

Very truly yours,
Moore McCormack Resources, Inc.

Joseph P. Liotta

Vito M. DeMaio

November 1975
Stamford, Connecticut

C24

1983 MSC Plan of Disposition

G-43A

INTER–OFFICE COMMUNICATION

Date March 1, 1983

To DISTRIBUTION

From C. B. Bezik

Subject: MILWAUKEE SOLVAY COKE CO.
Plan of Disposition

Attached are the minutes of the meeting held at Milwaukee Solvay Coke Co. on February 23, 1983, along with a tentative timetable for the disposition.

If you have any questions, please contact me.

C. B. Bezik

CBB/mah
attachments

DISTRIBUTION:
E. Hoyt III
R. McInnes
J. T. Ansberry
R. E. Berger
J. J. Blecha
A. J. Carlson
J. R. Lenz
T. J. Manthey
C. L. Matson
R. M. Power
J. E. Rossi
W. N. Thomas
G. B. Weir

1983 plan of disposition

RECEIVED
FEB 28 1983
A. J. CARLSON

MILWAUKEE SOLVAY COKE CO.

Plan of Disposition

On February 23, 1983, the indicated individuals met at Milwaukee to discuss the plan of disposition and to review the activities to date. J. R. Lenz is to be responsible for the overall coordination of the disposition plan. Attached are a copy of the meeting agenda and a summary of the overall timing of the disposition.

Current Operations - Lenz

Due to quality problems associated with the coal for industrial blend, Milwaukee switched to producing only foundry coke in mid-February. Based upon coal supplies, foundry production should cease about March 10-12. It is expected that industrial blend production will terminate prior to the end of March. Currently, Milwaukee has 94 of the 100 ovens in operation and is pushing 45-55 ovens per day based upon a 40 hour cycle time. The production tonnages previously projected were considered realistic, with possibly some additional degradation into the smaller sizes.

The sale of coal and coke breeze is estimated to be 25M tons of each. While there is 25M tons of breeze available, only 8/10M tons are segregated from the other products. There have been considerable problems in the screening operations due to wetness.

The projected reductions in manning levels should result in the following numbers of employees at each date:

		Beginning of Month		
	Currently	April	June	July
Salary*	20	15	5	4
Hourly	106	10	-	-
Total	126	25	5	4

*Includes J. R. Lenz

All hourly employees will be terminated prior to the expiration of the labor contract on May 25. Afterwards, one former hourly employee will be hired on an independent contractor basis to load-out coke (included in the salary numbers). After the expiration of the contract, security will be provided by an outside service, which should result in a cost savings. The Industrial Relations Dept. has indicated that contracting security outside, after the contract date, should not present a union problem. Representatives of the Employee Benefits Dept. are scheduled to be at Milwaukee the first week in April to discuss pensions, medical benefits, etc. J. R. Lenz indicated that the Milwaukee employees have already raised a series of questions which have been relayed to Employee Benefits.

Coke Sales - Blecha

Foundry selling prices are under pressure and are expected to erode by $2/3 per ton, resulting in a net realization of $149/150 per ton of coke. Nut and pea sales at $60 per ton appear realistic, since Koppers is currently selling nut at $60 per ton. The estimate of $100 per ton for stove and smelting coke may be $5 per ton too high. Revenues from coke for the year had been estimated at $4,329M, however, this now appears about $80M too high. It is expected that the timing of the sales will be stretched-out from the original projection, which estimated the completion of sales in November of this year.

Koppers does not appear receptive to buying out all or part of the inventory on hand at the end of production. Blecha has discussed with two major customers purchasing the ending foundry inventory. In one case, the inventory would have to be stored by Milwaukee, which could be a problem if the facility was disposed of promptly.

Coal and Breeze Sales - Carlson, Power and Blecha

Several alternatives for disposing of these inventories have been explored to date:

1. Combined sale of coal and breeze to Northern States Power.
2. Sale of coal to Wisconsin utilities.
   a. High vol only to Wisconsin Electric Power.
   b. Low vol or both to Wisconsin Power & Light.
3. Sale of breeze to Koppers.

The combination sale to Northern States Power would not require screening and would sell at a price of between $15/20 per ton. A meeting with Northern States Power by Carlson will be scheduled for the beginning of March. On a potential sale to the electric utility, a price in the range of $25/30 is estimated, however, no actions can be taken until April when the actual coal quality and quantity can be determined. Sales to the utility will require screening and the associated costs of labor, equipment rental, etc. Koppers has been approached to purchase the breeze at $15/20 per ton. In conclusion, the present alternatives will be further investigated with the objective of disposing of these inventories at the best price within the year.

Tar, Sludge and Environmental Issues - Carlson

The tar is being sold on "as is" basis, in the tank, except that it must be "pumpable", which requires heating. The sale of this tar (approximately 150,000 gallons @ $0.10/gallon) is expected to realize $15,000. The sale of the sludge is expected to start March 7. In addition, considerable sludge-tar is contained in the tunnel. The removal of this sludge-tar is expected to be a break-even operation, at best, due to the required back-filling.

Tar, Sludge and Environmental Issues - Cont'd.

The stability of the soil structure appears poor. In the 1800's, the land was essentially swamp. The oven structures are supported by ninety foot wooden pilings. In order to test for potential contamination, A. J. Carlson is recommending boring 4-8 holes to the depth of four to six feet. The cost of this program is estimated to be $5,000.

Equipment Disposition - Matson, Rossi, Thomas

C. L. Matson provided a detail listing of 300 items of which about 240 are classified as saleable. Other items, which are not considered valuable, were not included in the listing. The summary schedule indicates that the saleable items have realizable value of about $300M. For all other items, the cost of dismantle and disposal, may equal the scrap value. Various methods of disposal were explored:

1. Disposal to other coke facilities.
   a. Empire Coke Company, which has the only similar oven arrangement, is to visit on or about March 10.
   b. Koppers is to be contacted the week of February 28 to determine their interests.
2. Disposal to equipment dealers, machine tool dealers and electrical equipment dealers.
   a. Purchasing has already contacted Mesabi Service.
   b. Other local dealers are to be contacted and a bidders list developed.
   c. W. N. Thomas will approach the suppliers of the emission control system to determine their interest in portions of the system.

In setting up the plan to dispose of the equipment, it was recognized that certain basic equipment, e.g., loaders, screens, can not be sold until all the inventories have been liquidated. Furthermore, some of the scrap at Milwaukee is owned by a local scrap dealer, who is to be advised to remove his scrap to facilitate the evaluation. This scrap dealer will be contacted to determine his interest on bidding on the removal of the equipment and demolition of the facility.

Facility Disposition

The potential for disposing of Milwaukee "as is" without clearing the land appears minimal. R. McInnes has been approached by Energy Solutions, who are proposing to burn municipal waste in the ovens. The financial position of Energy Solutions appears questionable. However, this contact will be followed-up immediately since the ovens may be of no value, once they are not heated. Likewise, J. R. Lenz was contacted by a legal firm in regard to the Milwaukee operations.

Since disposition "as is" does not seem likely, demolition options are to be pursued. Written proposals are to be solicited from the three major real estate brokers in Milwaukee, plus Ostendorf-Morris. R. M. Power has approached Wisconsin Electric, Morton Salt and Miller Brewing to determine their potential interest in the land as a coal dock or storage yard, however, none of them are extremely interested. J. J. Blecha has proposed retaining 12-18 acres in the South yard to utilize as a coke terminal, perhaps in partnership with Jack Grey Transportation. J. J. Blecha is to determine the financial viability of establishing a coke storage facility in this location. Another possibility discussed was selling or leasing a portion of the land to Wisconsin Wrecking, who operates the concrete crushing operations next door. It was concluded that while all these opportunities will be explored, the best approach would be to sell the land to the city as part of their development efforts.

Following a contact that R. M. Power had initiated with the Port Director and the Milwaukee Development Corporation, R. McInnes, R. M. Power and J. R. Lenz met at 2:30 p.m. with Bill Drew and one of his people at the Milwaukee Development Corporation office. This meeting negated any near-term interest of either the Port Authority or the City in the coke plant property. One item of information obtained, however, was that the railroads are asking substantially more than $45M per acre for industrial land in the Milwaukee area.

A related issue is the possibility of selling Milwaukee's "emission credits", which can be sold separately or reserved for the buyer of the property. The value of such credits and the governmental notifications/approvals necessary are to be investigated by J. R. Lenz as part of his contacts with local government. Briggs and Stratton have expressed an an interest in purchasing these credits.

On the specifics of demolition, Purchasing and J. R. Lenz are to contact several salvage outfits to determine expected salvage realization, etc. Purchasing has estimated that it will require ten men approximately six months to demolish Milwaukee. The cost and time required is dependent upon the extent of demolition, i.e., to ground level or leave foundations, all or some of the buildings, etc. J. R. Lenz indicated that instead of heating the office building next fall-winter, a construction trailer would be more economical. In summary, several approaches to disposal are to be explored, with the objective of disposition by the end of 1983 on a break-even or better basis.

Conclusion

The next meeting was scheduled for Wednesday, March 23 at Milwaukee to discuss the progress to date in the plan of disposition. In the interval, all activities are to be coordinated through J. R. Lenz.

Participants in the meeting were:

R. McInnes
J. T. Ansberry
C. B. Bezik
J. J. Blecha
A. J. Carlson
J. R. Lenz
C. L. Matson
R. M. Power
J. E. Rossi
W. N. Thomas

Attachment A

MILWAUKEE SOLVAY COKE CO.
Plan of Disposition - Tentative Timetable

Time Period	Schedule of Activities
Early March	Contact Northern States Power re: coal-coke/breeze mix. Tar/sludge removal. Contract for soil testing. Visit by Empire (March 10?) to view equipment. Visit by Koppers re: interest in equipment. Develop bidders list re: equipment and demolition. Contact real estate brokers re: land proposal. Contact local scrap dealer to remove his scrap from premises. Approach tax authorities re: real and property taxes. Contact Abex Foundry re: their demolition experience.
End of March	Coking operations terminate.
Early April	Reduction in workforce. Visit by Employee Benefits representative. Screening coal operations continues. Visits by equipment dealers, salvage companies.
Early May	Contact Wisconsin utilities with coal specifications.
Summer	Sell-off of equipment. Begin demolition (?) -- expected to require six months.
November	Clean-up of all coke, coal and breeze inventories.

Follow-Up Issues in Cleveland

1. Tax Department - Property tax reappraisal.
2. Employee Benefits - Hourly employee's question re: pension reserves.
3. Contact Ostendorf-Morris re: real estate proposal.

MILWAUKEE SOLVAY COKE CO.

Plan of Disposition -- February 23, 1983

MORNING

Introduction

- Objectives of the meeting
  (a) Coordinate activities
  (b) Develop an overall schedule of actions and time frame

Lenz

Status of Current Operations

- Expected date of terminating coke operations - when in March?
- Inventory of coal, coke, breeze on hand at end of operations
- Review phase-out of employment
- Estimate of continuing idle expenses

Blecha

Sales of Coke Inventory

- Plan to dispose of small size coke
- Timing of sales of coke inventory
- Projected market prices and costs of disposal

Power/ Blecha

Sales of Coal and Breeze Inventory

- Report on activities to date
- Identity of potential customers
- Timing of disposition of inventory
- Pricing strategies
- Costs to sell inventory - screening, loading, etc.

Carlson

Sales of tar - Environmental Issues

- Report on activities to date
- Sale of tar - timing, pricing and associated costs
- Local government contacts
- Other governmental issues, e.g., property taxes

MILWAUKEE SOLVAY COKE CO.
Plan of Disposition
February 23, 1983

Matson/
Rossi/
Thomas

Disposition of Equipment

- Report on activities to date
  (a) Discussions with Empire
  (b) Blecha's approach to Koppers (containers)
- Summary list of Equipment (HAND OUT)
  (a) Identification of items
  (b) Estimated market value
  (c) Timing of removal
    - Saleable immediately
    - When operations cease
- Alternative approaches to disposition or other uses of equipment
  (a) Mobile equipment
  (b) Track equipment
  (c) Stationary equipment
  (d) Scrap items
- Emission control system and larry car --- saleability --- these are the major capital investments
- Securing assets after operations cease
- Coordination of disposal efforts

Matson/
Rossi
Others

Disposition of Facility and Land

- Alternative uses, e.g., plasmasmelt prototype
- Site advantages include river and railroad access
- Retain two office buildings and rent out (if no sales opportunities)
- Potential sales "As Is"
- Dismantle and clear land
  (a) Contact salvage companies
  (b) Costs and realizable amounts
  (c) Security of assets and liability during dismantling
- Sale of land to city or other opportunities through professional brokers

Ansberry

Other Issues

- Monitoring costs of disposition

McInnes

Summary

- Summarize overall timing of disposition plans
- Appoint a coordinatior of activities
- Establish next general meeting date; if needed

MILWAUKEE SOLVAY COKE CO.
Plan of Disposition
February 23, 1983

AFTERNOON

McInnes and Lenz

2:30 p.m. - Meeting with Milwaukee Development Corp. (B.Drew)

Others

Walk-around tour of MSC facility

Participants

R. McInnes
J. T. Ansberry
C. B. Bezik
J. J. Blecha
A. J. Carlson
J. R. Lenz
C. L. Matson
R. M. Power
J. E. Rossi
W. N. Thomas

c25

DIRECTORY

TO THE

IRON AND STEEL WORKS

OF THE

UNITED STATES.

EMBRACING A COMPLETE LIST OF THE

BLAST FURNACES, ROLLING MILLS, STEEL WORKS, FORGES, AND BLOOMARIES IN EVERY STATE AND TERRITORY; ALSO, WIRE MILLS, WIRE-NAIL WORKS, CAR-AXLE WORKS, CAR-WHEEL WORKS, CARBUILDERS, LOCOMOTIVE WORKS, WROUGHT-IRON PIPE WORKS, AND CAST-IRON PIPE WORKS.

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TENTH EDITION.

CORRECTED TO NOVEMBER, 1889, WITH ADDENDA.

PHILADELPHIA:

PUBLISHED AT NO. 261 SOUTH FOURTH STREET.

1890.

built in 1870 and 1871; ores, ½ Lake Superior and ½ Iron Ridge; annual capacity, 65,000 net tons. Mayville Furnace, located at Mayville, Dodge county, has one stack, 67 x 13, built in 1848 as a charcoal furnace, rebuilt in 1872 and 1884, and remodeled and enlarged in 1887 to use coke; ores, Menominee, Gogebic, and local; annual capacity, 20,000 net tons. Fuel used at both works, Connellsville coke; product, Bessemer, foundry, and mill pig iron. *See Furnaces in Illinois. See Rolling Mills in Illinois and Wisconsin.*

Minerva Furnace, Minerva Furnace Company, lessee, 70 Dearborn st., Chicago. Furnace at Milwaukee. One stack, 55 x 15, built and put in blast in the summer of 1873; leased by present company in 1889; fuel, coke; ore, Lake Superior; product, foundry pig iron; annual capacity, 28,000 net tons. E. A. Hyde, President; W. H. Ross-Lewin, Vice-President and Secretary; J. F. Forsyth, Treasurer. Sales agents, Forsyth, Hyde & Co., Chicago.

West Superior Iron and Steel Company, West Superior, Douglas county. Foundations started for one 80 x 18 coke furnace, to be completed in 1891. James Roosevelt, President, Hyde Park, N. Y.; Francis H. Weeks, Secretary and Treasurer, 120 Broadway, New York; Wm. F. Mattes, General Manager, West Superior.

Number of coke furnaces in Wisconsin: 4 completed stacks, and one stack building. Total number of furnaces in Wisconsin: 10 completed stacks, and one stack building.

MINNESOTA.

COKE.

Duluth Iron and Steel Company, Duluth, St. Louis county. Building one stack, 75 x 16, to use coke; three Gordon-Whitwell-Cowper stoves. R. S. Munger, President; W. H. H. Stowell, Secretary.

Number of furnaces in Minnesota: one coke stack building.

MISSOURI.

COKE.

Jupiter Iron Works, Jupiter Furnace Company, St. Louis, St. Louis county. One stack, 75 x 20, finished in 1873, blown in for the first time in 1880; remodeled in 1887; three Gordon-Whitwell-Cowper stoves; fuel, coke; ores, Iron Mountain and Pilot Knob and about ¼ red hematite; annual capacity, 50,000 net tons. W. O. Garrison, Secretary.

Missouri Furnaces, Missouri Furnace Company, 204 North Third st., St. Louis. Two stacks, each 56 x 15, built in 1870, and remodeled in 1887; two Gordon-Whitwell-Cowper stoves; fuel, Connellsville coke; ores, Iron Mountain, Shepherd Mountain, Pilot Knob, and Southwest; product, mainly Bessemer pig iron; total annual capacity, 50,000 net

DIRECTORY

TO THE

IRON AND STEEL WORKS

OF

THE UNITED STATES. and Canada

EMBRACING A FULL LIST OF THE BLAST FURNACES, ROLLING MILLS, STEEL WORKS, BLOOMARIES, AND TIN AND TERNE PLATE WORKS IN THE UNITED STATES; ALSO CLASSIFIED LISTS OF WIRE ROD MILLS, RAIL MILLS, STRUCTURAL MILLS, PLATE, SHEET, AND SKELP MILLS, AND BESSEMER, OPEN HEARTH, CRUCIBLE, AND STEEL CASTING WORKS.

COMPILED AND PUBLISHED BY

THE AMERICAN IRON AND STEEL ASSOCIATION. Institute, New York

SEVENTEENTH EDITION. CORRECTED TO MARCH 1, 1908.

PHILADELPHIA:

THE AMERICAN IRON AND STEEL ASSOCIATION,

No. 261 South Fourth Street.

1908.

chiefly from Milwaukee; ores, Lake Superior and local from near Iron Ridge, partly mined by the company; product, Bessemer, malleable Bessemer, and foundry pig iron; annual capacity: Furnace A, 75,000 tons; Furnace B, 90,000 tons: total, 165,000 tons. Brands, "Sydney" and "Gertrude." Ferdinand Schlesinger, President, Edgar N. Dickson and Henry J. Schlesinger, Vice Presidents, Armin A. Schlesinger, Treasurer, and Jerome Havlisch, Secretary, Milwaukee; William K. Packman, General Manager, Mayville. Selling agents, Pickands, Brown & Co., Milwaukee and Chicago.—*Both active in 1907.*

Milwaukee Works, Bay View Furnaces, The Illinois Steel Company, Chicago. Two coke furnaces at Milwaukee.—*See page 25.*

Spring Valley Furnace, Spring Valley Iron and Ore Company, 1135 Monadnock Building, Chicago. Furnace at Spring Valley. One stack, 66 x 13½, built in 1892–3 to use charcoal for fuel; equipped with machinery from the Fannie Furnaces, at Shawnee, Ohio; first blown in February 20, 1894; fuel changed from charcoal to coke in 1899, but occasionally charcoal is used; three 2-pass Siemens hot-blast stoves, each 63 x 17; ore, brown hematite chiefly mined by the company; product, malleable Bessemer and foundry pig iron; annual capacity, 35,000 tons. Brand, "Spring Valley." Connected with the furnace are 46 charcoal kilns with an annual capacity of 1,800,000 bushels. Frederick H. Foote, President and Treasurer, Chicago; George C. Foote, Vice President, Port Henry, New York; Wallace P. Foote, Secretary, and H. B. Feidler, Superintendent, Spring Valley. Selling agents, Pickands, Brown & Co., Rookery Building, Chicago.—*Active in 1907.*

Thomas Furnaces, The Thomas Furnace Company, Milwaukee. One completed stack and one stack building. The completed stack, 75 x 16, was built in 1873 and blown in in the spring of that year; rebuilt in 1892 and in 1901; two Hugh Kennedy hot-blast stoves, each 60 x 18, and two Massicks & Crooke stoves, 75 x 18. Building stack, to be 80 x 18½; construction commenced June 3, 1907; new furnace will use stoves of old furnace, which will be dismantled. Fuel, coke; ore, Lake Superior partly mined by the company; product, foundry, malleable Bessemer, and standard Bessemer pig iron; specialty, malleable Bessemer pig iron; annual capacity, 90,000 tons. Brand, "Thomas." John M. Thomas, President and Manager, Milwaukee; W. Aubrey Thomas, Vice President, and T. E. Thomas, Treasurer, Niles, Ohio. Sales made by the company.—*Old furnace, active in 1907, being dismantled.*

Number of furnaces in Wisconsin: 6 completed and one building. Of these 5 use coke alone, one coke stack is being built, and one stack uses coke principally but occasionally charcoal alone.

CHARCOAL FURNACES—1.

Ashland Plant, Lake Superior Iron and Chemical Company, Detroit. Furnace at Ashland. One stack; fuel charcoal. (Formerly called Hinkle Furnace and operated by the Ashland Iron and Steel Company.)—*See page 215.*

Number of charcoal furnaces in Wisconsin: one stack.

Total number of furnaces in Wisconsin: 7 completed and one building. Of these 5 stacks use coke alone, one coke stack is being built, one stack uses coke principally but occasionally charcoal alone, and one stack uses charcoal. No bituminous coal furnaces.

ROLLING MILLS AND STEEL WORKS—16.

Bay View (The) Steel Casting Company, Milwaukee. Built in 1894; 6 crucible steel-melting furnaces with 3 chambers each; 18 holes can be used at a heat; first crucible steel made November 27, 1894; product, steel castings; annual capacity, 750 tons. Fuel, oil. M. C. Rice, President; N. T. Moore, Vice President; T. H. Rice, Secretary, Treasurer, and Manager. (One 1-gross-ton acid open-hearth furnace, built in 1897, dismantled in 1905.)

Bucyrus (The) Company, South Milwaukee. Built in 1892; one 10-gross-ton stationary basic open-hearth steel furnace added in 1905–6; first steel made February 27, 1906; 2 gas producers, 2 annealing furnaces, and 2 cupolas; product, steel castings, used by the company in the manufacture of dredges, steam shovels, railroad wrecking cranes, pile drivers, excavating machinery, etc.; annual capacity, 4,500 tons of steel castings. Fuel, producer gas. Also makes gray iron machinery castings; annual capacity, from 3,600 tons to 4,000 tons. Building an additional 12-gross-ton basic open-hearth steel furnace. Howard P. Eells, President; S. L. G. Knox, Vice President and Chief Engineer; E. K. Swigart, Secretary and Treasurer. New York office, 628 Singer Building.

Crucible Steel Casting Company, 612 Clinton st., Milwaukee. Built in 1898; eight 3-hole crucible steel-melting furnaces; first steel made in December, 1898; 16 pots can be used at a heat; product, machinery castings of all kinds; annual capacity, 1,500 tons. Fuel, oil. F. A. Lange, President and Manager.

Dutcher (The) Company, Milwaukee. Four 4-pot Noble liquid-fuel crucible steel-melting furnaces built in 1889 and first steel made in that year; not now used. Open-hearth department added in 1895 and enlarged in 1906; now contains one 10-gross-ton acid furnace; first open-hearth steel made in 1895. Product, chiefly bicycle, machinery, and electrical castings; annual capacity, 4,000 tons of open-hearth and 75 tons of crucible castings. Fuel, oil.

C26

"Coal to Dyestuffs"

Pre - 1928 Operations

The MILWAUKEE COKE & GAS CO.

CONTROLLED BY THE NEWPORT CO.

Milwaukee, Wisconsin

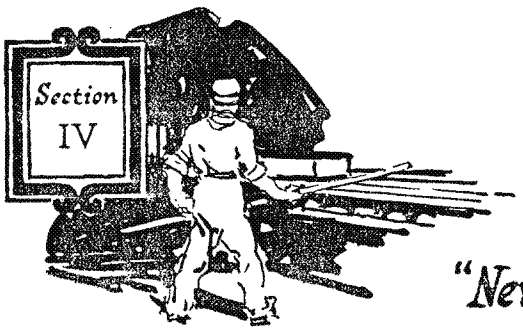
THE Milwaukee Coke & Gas Company's plant for making gas, coke and by-products of the coking process was one of the first to be established in the Middle West; in fact, it was built within the first decade after the use of by-products ovens was introduced into this country.

The Coal Supply:—Mines in West Virginia and Kentucky belonging to companies subsidiary to TheMilwaukee Coke & Gas Company, supply the plant with coal which is received at its modern concrete dock,600 feet long, on the Kinnickinnic River. Large 10,000 ton boats are unloaded in eighteen actual working hours by three "Fast Plants," two steam and one electric. In "breaking down" a boat, the grab buckets hoist two and one-half tons of coal each trip, and are regulated to make one hundred trips per hour. Coal from the boats can be unloaded directly upon the dock or conveyed by belt to the storage field and oven coal bins.

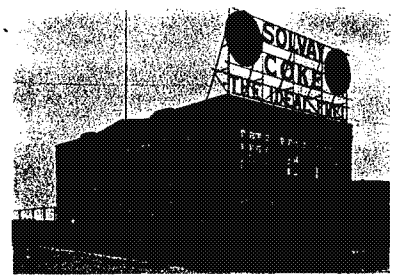
From the dock the coal is conveyed by a system of belt conveyors, approximately 5,000 feet long and having a carrying capacity of 600 tons per hour, to a large storage field, covering eight acres and capable of storing 450,000 tons. The pivoted bridge, at the time of its construction the largest reclaiming gantry in the world and then ridiculed by critics as impracticable, swings over the storage field on a semi-circular track. It is used both for storing, by means of a belt and tripper running its entire length, and for reclaiming by means of a 5-ton bucket, having a capacity of 300 tons per hour.

Coal reclaimed from storage or brought direct from the dock is screened to 2½" or smaller size, passed over magnetic separators which separate the tramp iron from the coal, and then conveyed into measuring machines which proportion the high and low volatile coals for the production of the best grade of coke.

Following the coal crushing and pulverizing process, the coal mixture is conveyed by a 2,000 foot system of conveyors to the oven storage bins, from which it is drawn and distributed to the ovens by three electric lorries, having a capacity of 2,800 tons each 24 hours.



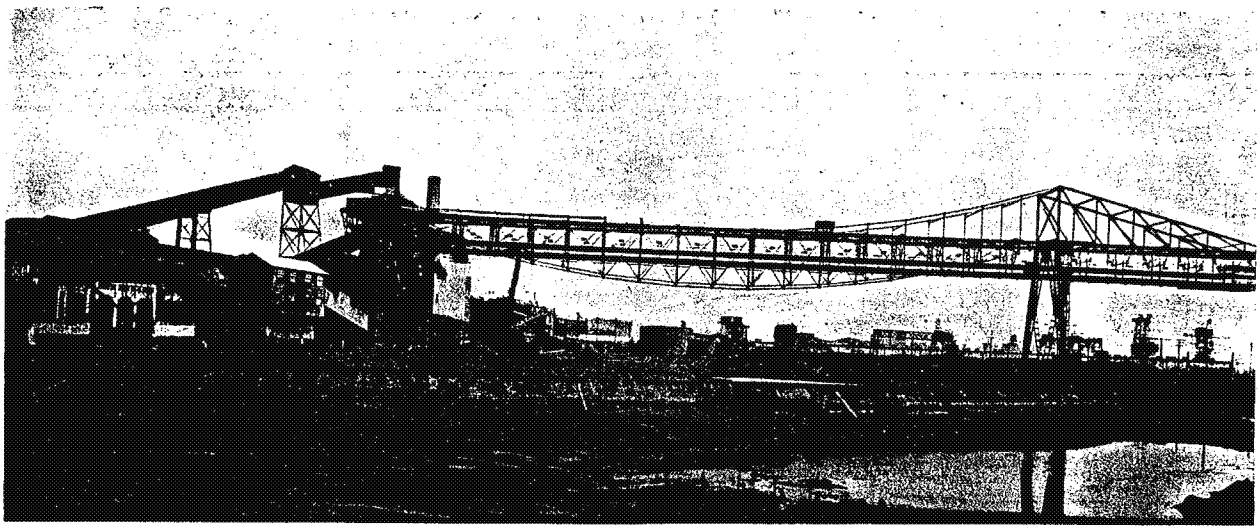
"Newport all the Way"



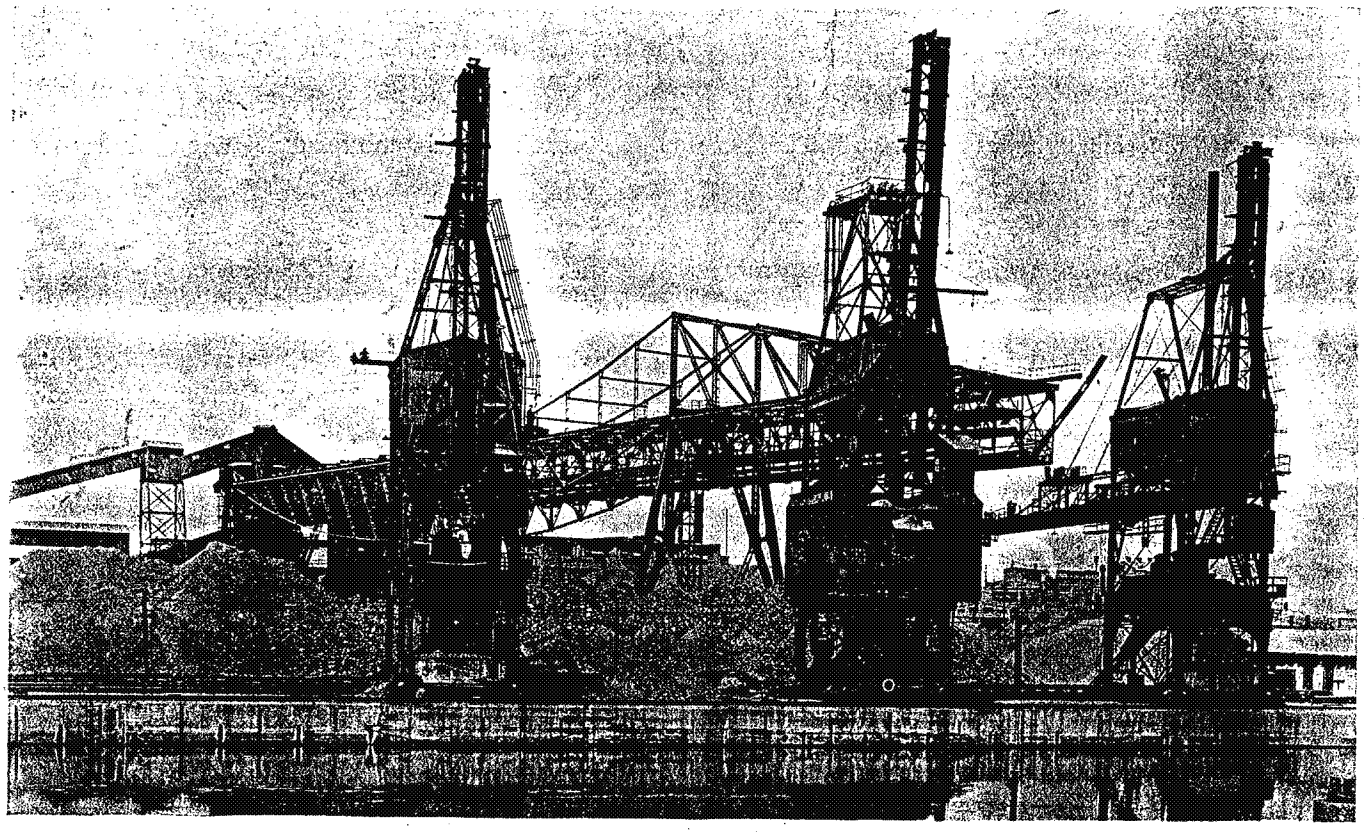
PLANT OFFICE

The Coke Ovens—The ovens consist of one battery of fifty 12 ton Kopper's Cross Regenerative Combination Coke and Gas Ovens which have been recently completed and put into operation. A second battery, similar to the first is now under construction and will be completed in the near future. The erection of a third battery is contemplated on the completion of the second. These replace the old ovens. One battery of forty ovens will not be replaced during the present reconstruction but will supplement the new ovens.

The Kopper's ovens being built are of the latest type, embodying the most advanced by-product coke oven practice known. They are so arranged that they can be heated by "producer gas." If this method of heating should be adopted, the supply of gas available for Milwaukee city consumption will be materially increased.

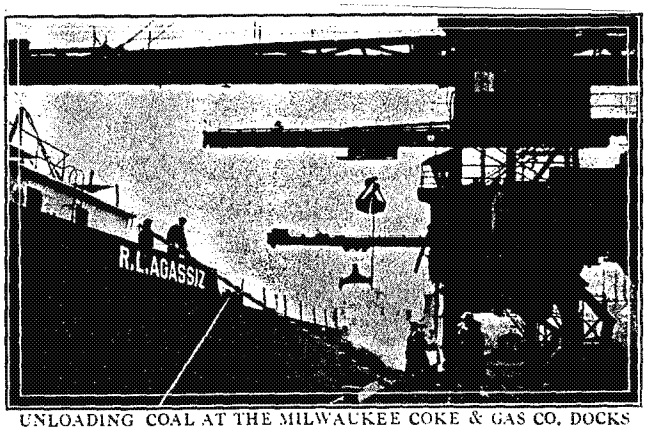


PIVOTAL STORING AND RECLAIMING GANTRY BRIDGE AND COAL FIELDS



UNLOADING EQUIPMENT AT THE MILWAUKEE COKE AND GAS COMPANY DOCK

Coke By-Products— In addition to the production of coke, the plant recovers the gas from the coal and in turn, by a stripping operation, removes from the gas, coal tar, ammonia, solvent naptha, benzol, motor fuel and toluol, much of which are utilized in the chemical works of The Newport Company at Carrollville, Wisconsin, as the basic material for the manufacture of dyestuffs, intermediates and pharmaceuticals. Part of the gas passing through the by-product operations is returned to the ovens for heating purposes and the remainder is delivered for distribution to the City of Milwaukee.



UNLOADING COAL AT THE MILWAUKEE COKE & GAS CO. DOCKS

Quenching Process—After the coal has been coked in air-tight ovens for a period of twelve to eighteen hours, it is discharged by large electrically operated rams or pushers into steel quenching cars, also electrically operated, which carry the glowing coke to the spray for quenching. After leaving the quenching shed, the cars pass to the sorting station, where foundry or run of oven coke (large sized) is loaded into box cars by a car tipple, or is crushed and screened for furnace coke. This car tipple was the first of its kind ever installed in this country. By its use, cars are tipped up on one end and loaded to capacity in fifteen minutes. It has supplanted 200 men formerly employed in wheeling, sorting and loading coke into cars.

Domestic Coke—Coke for domestic purposes is crushed and elevated to the top of a large Domestic Coke House, where it is screened into Egg, Range, Chestnut and Pea Coke sizes, by two large rotary screens, with a capacity of 1,000 tons per day. The coke handling department has a capacity of 800,000 tons of coke annually.

Electrical Power Plant—The plant generates all electric current consumed by means of two 600 K. W. mixed pressure turbo units and four auxiliary engine driven units of 900 K. W. capacity, giving a total rated capacity of 2,100 K. W. The mixed pressure units were installed for the purpose of economically utilizing all the exhaust steam, not consumed in the manufacturing processes.

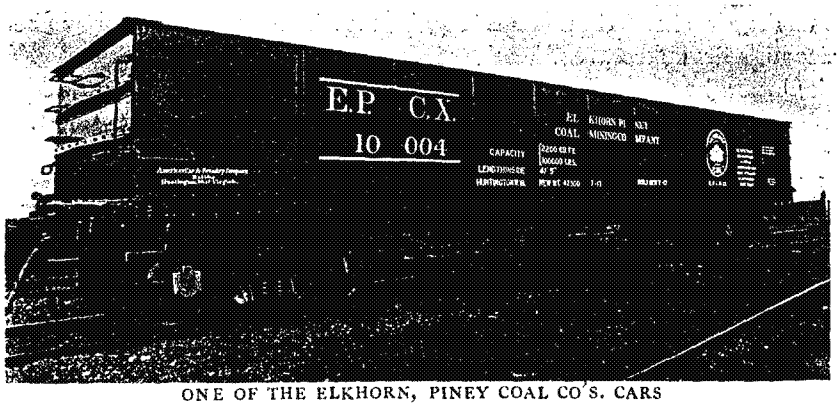
Steam Power Plant—Steam is generated in a modern plant equipped with eight boilers, capable of producing eight thousand Boiler Horse Power.

Water Supply—The water supply for the plant is brought to two De Laval geared pumping units through two 24-inch suction mains nearly 1,200 feet in length. Each unit consists of an 18 inch and 14 inch centrifugal pump arranged to operate in tandem and has a total capacity of 15,000 gallons per minute, one unit operating and the other reserved as a spare.

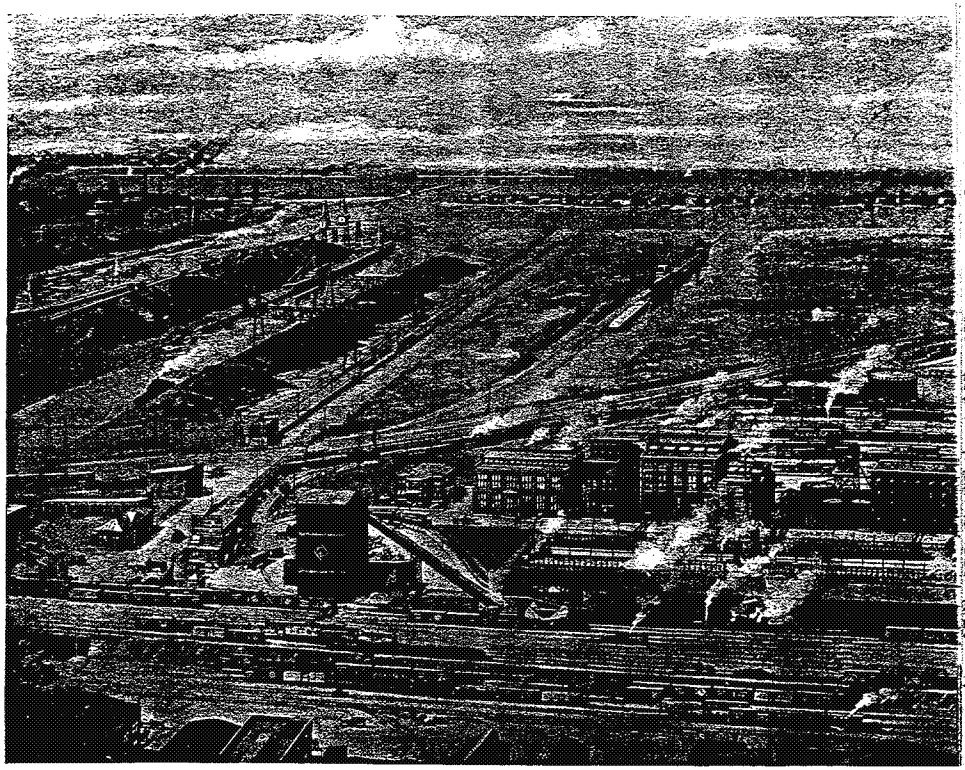
General—Other features of interest are: The company garage, housing over 50 automobiles and making complete repairs on company owned automobiles.

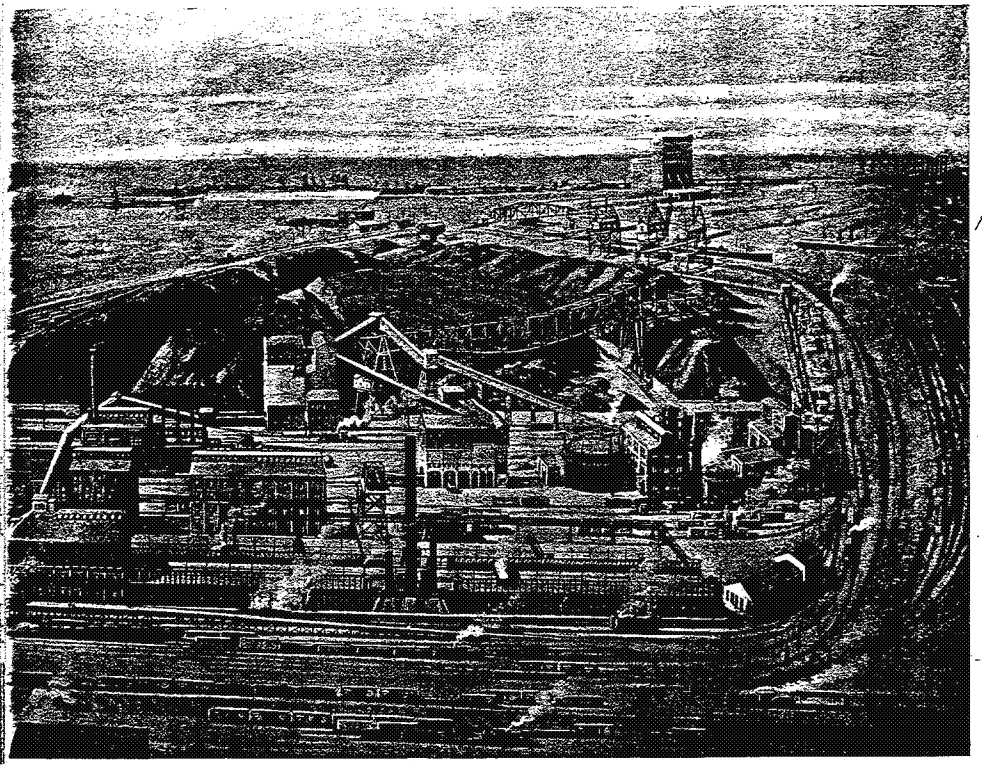
A "First-Aid" Hospital, fully equipped and having a nurse in constant attendance, takes care of the employes who require first aid in cases of accidents or sickness. All employes are covered by group insurance carried by the company.

The Conveyor—A plant publication, "The Conveyor," is issued monthly to all employes. Because of its general interest, it enjoys an extensive outside circulation.



ONE OF THE ELKHORN, PINEY COAL CO'S. CARS





BY-PRODUCT COKE PLANT OF THE MILWAU COKE AND GAS CO., MILWAUKEE, WISCONSIN

The plant works are situated upon a triangular tract of about 28 acres, lying between the Chicago and North Western and Chicago, Milwaukee & St. Paul Railways and the Kinnickinnic River. The site was originally marsh land, but by reclamation has been converted into one of the most valuable and advantageous industrial locations in Milwaukee. The very best of shipping facilities are afforded by two railroads and private dock accommodations for large coal carrying steamers operating upon the Great Lakes.

The dock frontage is 600 feet. There are 5 miles of railroad track on the property, three locomotives and three locomotive cranes with which to handle equipment and product, and a concrete road extending to various parts of the plant to facilitate the handling of domestic coke and other materials by wagon and motor trucks.

The Milwaukee Coke & Gas Company indirectly supplies the City of Milwaukee with illuminating and fuel gas, furnishes coke to a large domestic trade in Milwaukee and numerous industrial plants for fuel and metallurgical purposes, and delivers a large part of its by-products from the coking operation to the dye, chemical and pharmaceutical plant of The Newport Company at Carrollville, Wisconsin.

The nature of the industry and the service it renders is such as to require a continuous operation of twenty-four hours of every day of the year, the employees working three shifts of eight hours each. Between 600 and 700 men are employed.

The coke ovens above shown are at present being dismantled and replaced with Koppers Cross Regenerating Combination Coke and Gas Ovens and which, when completed, will double the productive gas capacity of the plant.

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